

U.S. Army Corps Of Engineers

Formerly Used Defense Sites Program

The logo for the Formerly Used Defense Sites (FUDS) program, featuring the letters "FUDS" in a white, serif font on a dark gray rectangular background.

FUDS

13 November 2006

Version 3.0

Cost-To-Complete (CTC) Estimate

Handbook

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TABLE OF CONTENTS

1. Introduction.....	1
2. Background.....	1
3. Statutory Requirements.....	2
3.1. Chief Financial Officers (CFO) Act	2
3.2. Government Performance and Results Act (GPRA)	2
3.3. Government Management Reform Act (GMRA).....	3
3.4. Federal Financial Management Improvement Act (FFMIA).....	3
4. Reporting Guidance	3
4.1. DoD Financial Management Regulation (FMR)	3
4.2. Defense Environmental Restoration Program (DERP) Management Guidance ...	4
4.3. ER 200-3-1, Formerly Used Defense Sites (FUDS) Program Policy	4
5. Environmental Liabilities.....	4
5.1. Definition	4
5.2. Reporting of Environmental Liabilities	6
6. Cost-To-Complete (CTC) Estimates.....	7
6.1. Achieving Auditable Estimates.....	7
6.2. An Overview of the CTC Process.....	7
6.3. Indexing of Previously Prepared Estimates	8
6.4. Responsibilities	10
6.5. Schedule.....	10
6.6. Assignment of Estimate Development Responsibility	11
6.7. Development of Estimates	14
6.8. Cost Estimating Systems – How to select the correct estimating tool.....	16
6.9. An Overview of the Quality Review of CTC Estimates.....	17
6.10. Quality Control Review	20
6.11. Archiving of CTC Estimate Phase Costs and Support Documentation to FUDSMIS	21
6.12. Supervisory Review	22
6.13. Quality Assurance Review.....	23
6.14. Locking of the Non-Current Year LCP in FUDSMIS for the Environmental Liability Report (ELR).....	24
7. Points of Contact.....	25
7.1. HQUSACE.....	25
7.2. HTRW Center of Expertise.....	25
7.3. Military Munitions Center of Expertise.....	26

Appendix A, References	A-1
Appendix B, Instructions For Developing FUDS CTC Estimates	B-1
Appendix C, Quality Control Review Checklist.....	C-1
Appendix D, Supervisory Review Checklist	D-1
Appendix E, HTRW CX and MM CX Qualification Statements.....	E-1
Appendix F, USACE Center of Expertise Quality Assurance (QA) Plan for FUDS Cost-to-Complete Estimates, FY2005	F-1
Appendix G, Environmental Liabilities Required To Be Reported on Annual Financial Statements (Report Number D-2004-080), Inspector General, Department of Defense, 5 May 2004.....	G-1
Appendix H, DAIM-ZA Memorandum, 18 November 2004, Subject: Improving the Reporting of Financial Liabilities	H-1
Appendix I, Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects	I-1
Glossary	Glossary 1

Cost-To-Complete Estimate Handbook for the Formerly Used Defense Site (FUDS) Program

1. **Introduction.** This *Handbook* was developed for U.S. Army Corps of Engineers (USACE) personnel at all levels engaged in the development, review, and archiving of cost-to-complete (CTC) estimates for Formerly Used Defense Sites (FUDS) projects. These estimates are used as the basis for the environmental liabilities reported in the Army's financial statements for the FUDS Program. This *Handbook* contains the most relevant and current information needed by USACE Divisions and Districts regarding the CTC process.

2. Background

2.1. According to Public Law 101-576, "Chief Financial Officers Act of 1991", each executive agency shall prepare and submit to the Director of the Office of Management and Budget (OMB) a financial statement for the preceding fiscal year. The CFO Act requires financial statements prepared by an agency be audited by the Inspector General in accordance with applicable generally acceptable government auditing standards and further requires the Inspector General to submit a report to the head of the auditing agency.

2.2. Environmental liabilities and disposal liabilities are reported on Note 14, "Environmental Liabilities and Environmental Disposal Liabilities", of the Department of Defense (DoD)-wide and the individual Service-wide balance sheets. Contingent liabilities are reported as part of Note 16, "Commitments and Contingencies". Environmental liabilities include estimated amounts for future cleanup of contamination resulting from waste disposal methods, leaks, spills, and other past activities that have created a public health or environmental risk.

2.3. Environmental cost estimators normally prepare CTC estimates that satisfy budgetary requirements. These estimates emphasize project validity and significance, not documentation of the methodology used to generate the estimates. However, Army management uses the budgetary estimates to report environmental liabilities on the Army financial statements. Because environmental budgetary estimates are used for financial statement reporting, the estimates are subject to financial management and accounting standards and are subject to audit. Financial management and accounting standards require supporting documentation for cost estimates.

2.4. Several recent audits of Army's annual financial statements identified serious deficiencies with the preparation and documentation of CTC estimates. Specifically, auditors concluded that the Army did not maintain adequate audit trails to ensure documentation was readily available to support the underlying assumptions of estimates and did not routinely document Supervisory Reviews or implement adequate control programs to ensure the reliability

and accuracy of the estimates.

2.5. As a result of these audits, the Department of the Army Comptroller has imposed a rigorous set of requirements and an aggressive schedule to obtain an unqualified audit opinion of its financial statements. The schedule requires that the Army's financial statements achieve a qualified audit opinion by the end of fiscal year 2007 and an unqualified opinion by FY2010. A qualified audit opinion means that some limitations exist with parts of the agency's financial statements, such as an inability to gather certain information. This is compared to an unqualified opinion, which basically states that the auditors feels the agency followed all accounting rules appropriately and that the financial statements are an accurate representation of the agency's financial condition.

3. Statutory Requirements

3.1. Chief Financial Officers (CFO) Act

3.1.1. In 1990, Congress passed the CFO Act that calls for the federal government to establish a foundation of basic financial management practices that are common and considered vital in the private sector. It directs the OMB to provide overall direction and leadership to the executive branch on financial management matters by establishing financial management policies and requirements.

3.1.2. The purpose of the CFO Act is to improve general and financial management practices in the federal government by requiring the development of an integrated financial management system, including financial reporting and internal controls. The Act also established a pilot project whereby certain agencies, including the Army, were also required to prepared auditable, commercial-style financial statements for the Fiscal Year (FY) 1992. The OMB extended this requirement through FY 1995.

3.2. Government Performance and Results Act (GPRA)

3.2.1. While the CFO Act established the foundation for improving management and financial accountability among the agencies, the GPRA of 1993 is aimed more directly at improving an agency's program performance. The GPRA forces a shift in the focus of federal agencies away from such traditional concerns as staffing and activity levels toward a single overriding issue – results.

3.2.2. The GPRA requires first that agencies consult with Congress and other stakeholders to clearly define agency missions. It requires that agencies establish long-term strategic goals, as well as annual goals. Agencies must then measure their performance against their goals and report the results to the public. Within the environmental arena, the Army's performance is measured against the Department of Defense Goals for DERP. The FUDS Program has internal performance indicators that are identified in Chapter 7 of Engineer Regulation (ER) 200-3-1, FUDS Program Policy.

3.3. Government Management Reform Act (GMRA). In 1994, Congress passed the GMRA, requiring all federal agencies, including the Army, to annually produce auditable financial statements beginning in FY1996. As the accounting service for DoD agencies, the Defense Finance and Accounting Service (DFAS) prepares the Army's Financial Statements. The Inspector General, DoD (DoDIG), is responsible to audit the Army's financial statements in accordance with applicable generally accepted government accounting standards and submit a report to the Auditor General, Department of the Army.

3.4. Federal Financial Management Improvement Act (FFMIA)

3.4.1. The FFMIA of 1996 advances federal financial management by ensuring that federal financial management systems can and do provide reliable, consistent disclosure of financial data. Further, the FFMIA requires these management systems do so on a basis that is uniform across the federal government, is consistent from year-to-year, and uses professionally-accepted accounting standards.

3.4.2. The FFMIA builds on the GMRA requirement for agencies to publish annual audited financial reports. It provides the basis for ongoing use of reliable financial information in program management and in oversight by the President, Congress, and the public.

3.4.3. The FFMIA impacts the Army in the following ways:

3.4.3.1. The Army is required to implement and maintain systems that comply substantially with:

3.4.3.1.1. Federal financial management system requirements.

3.4.3.1.2. Applicable federal accounting standards, and

3.4.3.1.3. The Standard General Ledger at the transaction level.

3.4.3.2. DoDIG is required to report on the Army's compliance with the three above requirements as part of financial statement audit reports.

3.4.3.3. The Army is required to determine, based on the audit report and other information, whether it's financial management systems (the FUDS Management Information System [FUDSMIS] for the FUDS Program) complies with the FFMIA. If it does not, the Army is required to develop remedial plans and file them with OMB.

4. Reporting Guidance

4.1. DoD Financial Management Regulation (FMR)

4.1.1. DoD Regulation 7000.14-R, "DoD Financial Management Regulation", Volume 4, Chapter 13, prescribes accounting policies and principles for measuring and recognizing DoD liabilities associated with the disposition of property, structures, equipment, munitions, and

weapons. The FMR also prescribes policy for measuring and recognizing the environmental liabilities associated with corrective actions, the future closure of facilities on active installations, and for the environmental response actions at operational test and training ranges on active installations.

4.1.2. FMR Volume 4, Chapter 14, prescribes the accounting policies and principles for measuring and recognizing DoD liabilities associated with the containment, treatment, or removal of contamination that could pose a threat to public health and the environment. This portion of the FMR also prescribes the accounting policy for accrued environmental restoration costs for general property, plant, equipment, and stewardship of land. Furthermore, it provides policy for accrued environmental restoration cost for properties with potentially responsible parties (PRP).

4.2. Defense Environmental Restoration Program (DERP) Management Guidance. The DERP Management Guidance provides program implementation information for environmental restoration at active installations, facilities subject to Base Realignment and Closure, and Formerly Used Defense Sites. This guidance document also provides requirements for CTC estimates and financial reporting of environmental restoration liabilities that use Environmental Restoration funds.

4.3. Engineer Regulation 200-3-1, Formerly Used Defense Sites (FUDS) Program Policy.

4.3.1. The FUDS ER 200-3-1 establishes the overarching USACE policy for management and execution of the FUDS program and takes precedence over previous USACE FUDS program policy and guidance. This regulation provides policy and guidance within USACE for the planning, programming, budgeting, execution, management, and reporting of all activities associated with FUDS properties and projects.

4.3.2. Appendix E of ER 200-3-1 establishes criteria and standards for development, review, and reporting of CTC estimates that support project management and upward reporting for the FUDS Environmental Restoration Liability, budget submittals, the Annual Report to Congress (ARC), and the DoD In-Progress Reviews.

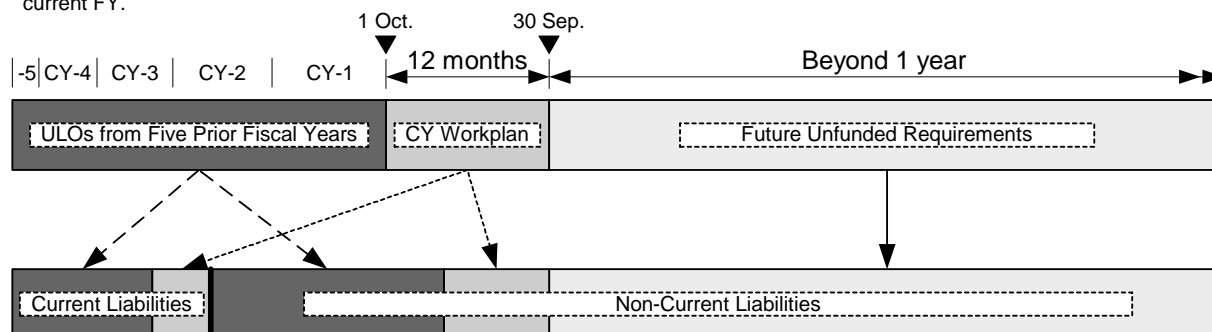
5. Environmental Liabilities

5.1. Definition

5.1.1. Liabilities are a normal aspect of conducting business. Rarely does a transaction occur that is liquidated on the spot as takes place in a cash or barter transaction. Instead, one party provides goods or services in exchange for a promise of payment in the future. The liability must be recorded, even if funds are not available. If that payment is likely to take place within the next 12 months, it is a current liability. If that payment is more likely to take place beyond the next 12 months, then it is a non-current liability. Current liabilities include those

unliquidated obligations from the preceding five years that are subject to payment in the next 12 months¹. See Figure 1.

On 1 October, the beginning of the Current Year (CY), the Current Workplan is authorized for obligation within the next 12 months. A portion of the CY Workplan obligations will be realized during the next 12 months along with some or all of the Unliquidated Obligations (ULOs) from the five prior FYs. Future Program unfunded requirements exist beyond the end of the current FY.



The Current and Non-Current Liabilities are determined on 30 September, the end of the current FY, for reporting in the FUDS Environmental Liability Report (ELR). Current Liabilities are payments made, during the Current Year, of obligations incurred from award of the CY Workplan plus obligations from the five prior FYs. The Non-Current Liabilities are those remaining ULOs from the five prior FYs plus the CY Workplan obligations that are carried over into future years plus the future unfunded requirements.

Figure 1. Determination of Current and Non-Current Liabilities.

5.1.2. When a condition, situation, or set of circumstances exist that involve uncertainty regarding a possible gain or loss, it is called a contingent liability. This uncertainty is resolved in the future when either something happens or an outcome is determined. The difficulty with contingent liabilities is determining their probability of occurrence and deriving an estimate of their costs. These two factors, probability of occurrence and the ability to estimate the expected cost, determine whether the contingent liability should be recorded and reported as a liability in Note 14, Environmental Liabilities and Environmental Disposal Liabilities or disclosed as a contingency in Note 16, Commitments and Contingencies, on the financial statements. For more details on recognizing contingent liabilities, refer to the Department of Defense Financial Management Regulation (DoDFMR), Volume 4, Chapter 12, paragraphs 120303 through 120305, and the Statement of Federal Financial Accounting Standards (SFFAS), Numbers 5 and 12.

5.1.3. Environmental liabilities include estimated amounts for future cleanup of contamination resulting from waste disposal methods, leaks, spills, and other past activities that have created a public health or environmental risk. Neither budget activities nor the availability of funding is a determining factor in recognizing environmental liability. Environmental liability

¹ Funds are available for the purpose of making expenditures for 5-years following the end of the fiscal year in which the funds were available for obligation. Unliquidated obligations (ULO) are incurred when orders are placed, contracts awarded, services received, and other similar transactions occur during a fiscal year that will require payments during the same or a future fiscal year.

estimates and reporting are mandatory regardless of whether the liability appears in budgets or requires future funding.

5.2. Reporting of Environmental Liabilities.

5.2.1. Each fiscal year, the Deputy Assistance Secretary of the Army (Financial Operations) issues a request for the actual liabilities, including current and non-current, and contingent liabilities in the area of environmental restoration, non-environmental, Judgment Fund, and all other liabilities not reported via automated systems. DoD guidance requires the Army and USACE to calculate the CTC estimate for each DERP cleanup program category² and use these values as the basis for the environmental liability reported in the Note 14. Quarterly updates are also provided to Army and OSD.

5.2.2. FUDS environmental liabilities submitted to Army and DoD are separated into two values, representing current and non-current liabilities, and include the following:

5.2.2.1. FUDS Project level Liabilities. These liabilities are associated with the planning, programming, and execution of response actions at FUDS projects. These liabilities are submitted as two sets of values; one for HTRW, CON/HTRW and BD/DR projects and the other for MMRP and MMRP/CWM projects. CTC estimates supporting these liabilities are developed, reviewed, and entered into FUDSMIS using the procedures in this *Handbook*.

5.2.2.2. FUDS Property level liabilities. These liabilities are associated conducting the property level Preliminary Assessment and developing the Inventory Project Report (PA/INPR) and community relations costs benefiting the FUDS property, including RAB and TAPP costs. These FUDS property level liabilities are developed and entered into FUDSMIS by USACE District personnel.

5.2.2.4. FUDS Program level liabilities. These liabilities include Management and Support (M&S) funds supporting HQUSACE, Divisions, Districts, and the Centers of Expertise; FUDS contribution to the Defense and State Memorandum of Agreement (DSMOA); FUDS support to the Department for Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR); and centrally funded FUDS initiatives such as the FUDS Information Improvement Program (FIIP). These program-related liabilities are estimated based on a combination of current, known, and estimated costs and are entered into FUDSMIS by HQUSACE personnel.

5.2.3. CTC estimates and the values reported in the annual financial statements for environmental liabilities must be consistent with each other and able to withstand an audit. In addition, these values must be consistent with the entries into FUDSMIS and in any reports

² The Defense Environmental Restoration Program (DERP) established three program categories: the Installation Restoration Program (IRP) category, the Military Munitions Response Program (MMRP) category, and the Building Demolition/Debris Removal (BD/DR) program category. Under the IRP category, FUDS reports the Hazardous, Toxic, and Radioactive Waste (HTRW) and the Containerized HTRW project liabilities. FUDS MMRP projects, to include munitions of explosive concern (MEC) and munitions constituents (MC) are reported under the DERP MMRP category. FUDS BD/DR projects are reported under the DERP BD/DR program category.

provided to outside entities, such as the DERP Annual Report to Congress. Therefore, the CTC estimates developed for the April Program Objective Memorandum (POM) exhibits will be utilized through-out the year for reporting. Refer to Table 2. To make certain that the estimate documentation and FUDSMIS entries support the financial statements, FUDSMIS, our feeder system, was revised to facilitate the entry of CTC data into the Project Life Cycle Plan (LCP), to record the results of the quality reviews performed, to store the CTC estimate as an attachment to the FUDS Project, and to place controls on when and how changes to the LCP can occur during the year. These and other changes are explained in the following sections of this *Handbook*.

6. Cost-to-Complete (CTC) Estimates

6.1. Achieving Auditable Estimates. When the DoD Inspector General audited the financial records of the Army and USACE for FY2002³, they identified critical deficiencies in the management of the CTC process. These deficiencies were in the four broad areas of: (a) Documentation, (b) Supervisory Review, (c) Quality Assurance/Quality Control, and (d) Feeder System Compliance. The Army committed to correcting these deficiencies and developed a Corrective Action Plan⁴. A stated objective of the Plan was to “implement these review procedures immediately to ensure cost-to-complete development efforts during fiscal year 2005 provide sound and auditable estimates of our financial liabilities” and further, to be able to obtain a qualified audit opinion by the end of FY2007.

6.2. An Overview of the CTC Process.

6.2.1. The term CTC refers to the estimated cost for cleanup of environmental contamination and response actions to address building demolition/debris removal (BD/DR) and military munitions, including munitions of explosive concern (MEC), munitions constituents (MC), and chemical warfare material (CWM). By definition, CTC includes costs in the current fiscal year (CFY), the Budget Year (BY), and all future years. The current year portion of the CTC is supported by the Corps of Engineers Financial Management System (CEFMS). The BY and beyond portion of the CTC is supported by an estimate, referred to throughout this *Handbook* as a CTC estimate. CTC estimates are used for several purposes including to support the planning, programming, budgeting and execution process; to estimate environmental liabilities; to track cost avoidance measures implemented by the USACE; and to report future program requirements. Because CTC estimates are used to estimate the environmental liabilities of the FUDS Program, they are subject to financial management and accounting standards and to subsequent financial audit.

6.2.2. CTC estimates form the basis of the environmental liabilities reported in the USACE Annual Financial statement in compliance with the CFO Act. In addition, CTC estimates must comply with DoD FMR 7000.14-R. This regulation requires documentation of: data sources; methods of estimating; and management review of CTC estimates. The FMR stipulates that CTC estimates are subject to audit. Therefore, information used to develop CTC

³ *Environmental Liabilities Required To Be Reported on Annual Financial Statements* (Report Number D-2004-080), Inspector General, Department of Defense, 5 May 2004. (See Appendix H.)

⁴ DAIM-ZA Memorandum, 18 November 2004, Subject: Improving the Reporting of Financial Liabilities. (See Appendix I.)

estimates for the USACE environmental cleanup programs is subject to audit by the DoDIG.

6.2.3. USACE guidance requires USACE Districts prepare annual CTC estimates for all eligible and approved⁵ FUDS projects that have not reached project completion. For the purpose of this **Handbook**, project completion is achieved when:

6.2.3.1. Building Demolition and Debris Removal (BD/DR) projects are designated as No DoD Action Indicated (NDAI)⁶ and recorded in the FUDSMIS.

6.2.3.2. Hazardous, Toxic, and Radioactive Waste (HTRW), Containerized HTRW (CON/HTRW), Military Munitions Response Program (MMRP), and Potentially Responsible Projects⁷ (PRP) project types achieve regulatory concurrence and this accomplishment has been recorded in FUDSMIS⁸.

6.3. Indexing of Previously Prepared Estimates.

6.3.1. Indexing of estimates refers to the process of applying a multiplier to the phase costs that were entered into FUDSMIS in a prior year to adjust the costs to current year dollars⁹. In a new fiscal year, only the BY and beyond portions of the CTC that was developed in a prior year are Indexed. For example, during FY07, USACE will use a multiplier to adjust the FY08 and beyond portions of the CTC (that were developed and entered into FUDSMIS in FY06) to FY07 dollars. All project costs in the approved CY Workplan (in the example, the FY07 workplan) will not be adjusted. The concept of Indexing is discussed in the FMR (Volume 4, Chapter 13 - September 2002 Section 130104), which states:

“Cost estimates shall be revised when there is evidence that significant change in the cost estimates have occurred, (e.g., changes in scope, ownership, regulation, or technology). As a minimum, the long-term cost estimates shall be adjusted (upward or downward)

⁵ Approved projects are those included in the Inventory Project Report (INPR), recommended by the District for inclusion in the FUDS program, and ultimately approved by the Division or HQUSACE. Refer to ER 200-3-1, Appendix B for a discussion of the INPR process. Only approved projects are reported in the FUDS Environmental Liability Report.

⁶ NDAI determinations are USACE programmatic decisions intended solely to assist USACE in demonstrating its accomplishment of DERP program goals and objectives to Army and DoD. Refer to ER 200-3-1, Chapter 6.

⁷ USACE focuses its PRP efforts toward settlement of any DoD CERCLA liability with other PRPs, rather than conducting response actions at properties with other PRPs. Therefore, CTC costs for a PRP project will normally only include those phases required to determine USACE's fair and equitable settlement amount. Only in cases where USACE undertakes the response action will the CTC estimate include all phases required for project completion. Refer to ER 200-3-1, Chapter 5.

⁸ FUDS Project CTC estimates do not include costs for FUDS pseudo projects. FUDSMIS uses pseudo projects to manage and track expenses for property level non-response activities, such as the Preliminary Assessment (PA), Restoration Advisory Boards (RAB), Technical Review Committees (TRC), Technical Assistance for Public Participation (TAPP), and Management and Support (M&S). Estimates for pseudo projects are based on historical information and the project manager's experience. Pseudo projects are not identified in the Inventory Project Report. Refer to ER 200-3-1, Appendix F.

⁹ Estimates are always developed and entered into FUDSMIS in current year dollars in the fiscal year when the CTC estimate was prepared. The phase cost multiplier is obtained from the Office of Management and Budget and applied to all phase costs for FUDS projects assigned as Indexed.

annually, through indexing, to maintain them on a current cost basis (i.e., as if acquired in the current period)."

6.3.2. To be considered for Indexing, Projects must have the following characteristics:

6.3.2.1. The estimate previously prepared must have met the standards contained in this **Handbook** for estimate development and must be available. For estimates prepared prior to FY07, the estimates will be available on the Project Information Retrieval System (PIRS). For project estimates completed during and subsequent to FY07, the estimates will be attached to, and available from, FUDSMIS.

6.3.2.2. The Quality Control (QC) and Supervisory Review (SR) Checklists (see paragraphs 6.10. and 6.12.) for the previously completed estimate documenting affirmative results must be available on PIRS for project estimates prepared prior to FY07. For project estimates prepared during and subsequent to FY07, the QC and SR Checklists must be available within FUDSMIS.

6.3.2.3. The site conditions upon which the previously completed estimate was developed must continue to reflect the project and there must be no new information that would require revision to the estimate.

6.3.2.4. The phase total and Project total amounts for the BY and beyond portion of the LCP in FUDSMIS are greater than zero and have not changed since the previous estimate was entered into FUDSMIS; i.e., the previously developed CTC estimate continues to support the LCP entries in FUDSMIS.

6.3.3. Other factors as discussed in paragraph 6.6.1. below may affect whether a Project is suitable for Indexing.

6.3.4. HQUSACE will obtain the multiplier used to adjust the phase level costs for all Projects assigned as Indexed. FUDSMIS will provide documentation of the Indexing process on the Estimate Assignment Screen.

6.3.5. Projects for which a Memorandum for Record (MFR) was used during FY2006 or prior to explain differences between the previously prepared CTC estimate and the amount reported in the FUDS Environmental Liability Report (ELR) are not candidates for Indexing. These projects will require revision to the existing estimate or preparation of a new estimate to reflect current project conditions.

6.3.6. If Projects have been Indexed several years, the District should critically review the Project to ensure conditions haven't changed that would require the existing estimate be revised or a new estimate prepared.

6.3.7. Although Indexing has the potential to reduce the effort associated with estimating the environmental liability of a project, indexing can only happen within FUDSMIS using the multiplier obtained by HQUSACE and the process described in this **Handbook**.

6.4. Responsibilities. Table 1 identifies the office elements and individuals responsible for the preparation, review, approval, and validation of CTC estimates.

Table 1 – Roles and Responsibilities for the Preparation, Review, Approval, and Validation of CTC Estimates.

Role	Responsible Office Element	Responsible Individual	Comment
Prepares CTC Estimate	USACE District Project Delivery Team (PDT).	PDT Team Member assigned by the USACE FUDS Project Manager (PM).	The PDT is a multidisciplinary team brought together to support the USACE District PM for the purpose of executing the FUDS project. Membership on the team includes cost estimators, Contractors, USACE Centers of Expertise (CX), or others trained in auditing principles and experienced in developing CTC estimates.
Conducts Quality Control Review	USACE District Quality Control team.	USACE District FUDS PM, supported by PDT members.	The PM is the lead for Quality Control on the FUDS Project. This is part of the broader role of the PM, as PDT lead, with responsibility of all aspects of project planning, programming, budgeting, execution, and reporting.
Conducts Supervisory Review	USACE District FUDS Program Manager (PgM)	USACE District FUDS Program Manager (PgM)	The PgM is the functional equivalent of the supervisor of the PM, and as such, performs the Supervisory Review of each FUDS project estimate. ¹⁰
Conducts Quality Assurance Review	USACE Division	USACE Division FUDS Program Manager (PgM)	The Division FUDS PgM performs a quality assurance Review of the estimating process; may be supported by USACE CXs.
Approves Estimates	Headquarters USACE (CEMP-DE)	HQUSACE FUDS Program Manager	HQUSACE FUDS PgM approves estimates used for reporting the FUDS environmental liabilities.
Validates Estimates	Assistant Chief of Staff for Installation Management (ACSIM)	Director of Environmental Programs	ACSIM collects and validates environmental liabilities submitted by USACE; checks to determine if all necessary program aspects are identified and reported.

6.5. Schedule. Table 2, which differs slightly from the schedule in Table E-1 of ER 200-3-1, establishes the annual schedule for CTC estimate development and update. Deviations from this schedule will be authorized by HQUSACE.

¹⁰ As the result of **FUDS Transformation**, the district PgM will reside in the Program and Project Management District (PPM) and will be responsible to perform the Supervisory Review for all FUDS Projects within the Regional Business Center (RBC). **FUDS Transformation** allows the option for the RBC to perform the district-level Program Management role for their districts. In this case, the RBC would assign a single lead within their Project Management District(s) to perform the Supervisory Review.

Table 2 – FUDS Schedule of CTC Estimate Development and Update.

ACTIVITY		CAN BE STARTED AS EARLY AS	MUST BE COMPLETED BY
FUDSMIS generates a list of projects requiring CTC estimates, assigns default estimate development responsibility, and records Division/District changes to the default estimate assignment.		N/A	N/A
District / Division Responsibilities	Districts review default estimate development responsibilities and modify as appropriate.	First working day of FY	3 rd Friday in October
	Divisions review District estimate development responsibilities and modify as appropriate.	On District Finalization	4 th Friday in October
	Districts prepare CTC estimates for District assigned projects,	First working day of FY	Mid January
	Districts perform QC Review .	On estimate completion	Early February
	Districts perform Supervisory Review .	On completion of QC Review	Mid February
CX Responsibilities	CXs prepare CTC estimates for CX assigned projects and submit estimates to Districts for QC Review	First working day of FY	Mid January
	CXs incorporate QC comments, complete final estimate revisions, and provide estimates to Districts.	On receipt of comments	Early February
	CXs perform QA Review of representative sample of CTC estimates and verify FUDSMIS LCP and CTC estimate amounts are consistent.	On completion of Supervisory Review	Last week in March
All estimates are QC Reviewed , Supervisory Reviewed , and QA Reviewed within FUDSMIS and available for HQUSACE use.		NA	Last week in March
Divisions, or CXs as requested by Divisions, submit After Action Report to HQUSACE.		1st week in March	Last week in April
CEMP-DE	CEMP-DE prepares POM exhibits and ELR. The BY and beyond portion of the LCP is locked in FUDSMIS.	NA	1st week in April
	CEMP-DE updates ELR. The LCP is unlocked in FUDSMIS ¹¹ .	NA	1st week in July

6.6. Assignment of Estimate Development Responsibility. The review of the assignment of estimate development responsibility for a fiscal year occurs within FUDSMIS.

¹¹ The BY and beyond portion of the LCP will be unlocked in FUDSMIS after Districts have completed their program development requirements and have balanced their project scheduling for the budget year through FY2020 and HQUSACE has downloaded FUDSMIS data for the ELR.

FUDSMIS initially assigns a “default” estimate preparation responsibility for all approved projects that have not achieved “Project Completion” to either the USACE District, the CXs, or as Indexed. The District Program Manager must review the default assignments to determine if the project estimate development responsibility has been assigned appropriately. The Estimate Assignment screen in FUDSMIS is refreshed nightly. Figure 2 shows the review of the estimate development assignment process in FUDSMIS.

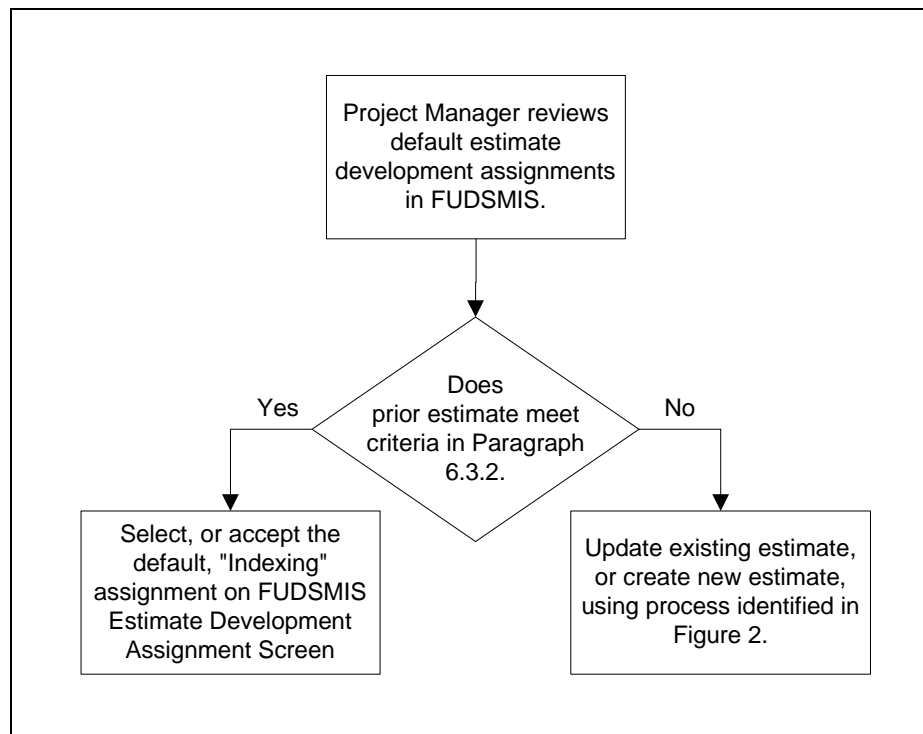


Figure 2. Review of the Default Estimate Development Assignments in FUDSMIS.

6.6.1. *Indexed Default Estimate Assignment.* Estimate development responsibility is assigned to Indexed by default for all project categories when the project meets the requirements discussed in paragraph 6.3.2.

6.6.2. *District Default Estimate Assignment.*

6.6.2.1. By default, estimate development responsibility is assigned to the District for projects that are being actively managed. This is characterized as projects having the Decision Phase “Completed” in FUDSMIS. The Decision Phase is the RI/FS or EE/CA for HTRW and MMRP projects and the RmD for CON/HTRW and BD/DR projects.

6.6.2.2. Also assigned to Districts by default are all PRP projects and all NDAI projects (excluding BD/DR) without regulatory concurrence. Projects that meet these criteria and are not being indexed will be defaulted to the District.

6.6.2.3. The District is responsible to evaluate the status of all District defaulted projects and either accept the default assignment, change the responsibility to the CX, or (if allowable) assign the project as Indexed.

6.6.3. *CX Default Estimate Assignment.*

6.6.3.1. Typically, projects assigned to the CXs by default are “pre-decisional”. “Pre-decisional” projects are characterized as having the Decision Phase is Underway or Future. As above, the Decision Phase is the RI/FS or EE/CA for HTRW and MMRP projects and the RD or RmD for CON/HTRW and BD/DR projects. In addition, all unplanned BD/DR, CON/HTRW, HTRW, MMRP and MMRP/CWM projects will be assigned by default to the CX. By USACE policy, *RACER* will be used to develop CTC estimates for these “pre-decisional” projects (see ER 200-3-1, Appendix E)¹².

6.6.3.2. HQUSACE has stipulated estimates for “pre-decisional” MMRP and MMRP/CWM projects not suitable for Indexing will be developed by the HTRW CX and the MM CX, respectively. Divisions and Districts cannot modify these CX default estimate assignments without HQUSACE approval.

6.6.4. *Reassignment of Estimate Development Responsibility.* With limitations, the District and Division FUDS Program Managers, in that order, can each reassign estimate development responsibility within FUDSMIS for individual projects. The following paragraphs discuss the process and limitations.

6.6.4.1. District FUDS Program Managers will either accept the defaulted estimate development assignments or reassign the estimate preparation responsibilities within FUDSMIS for projects other than pre-decisional MMRP and MMRP/CWM assigned to the CXs. Before making an estimate preparation assignment to the CX for a project with costs in the CY or BY, Districts should carefully consider where the project is in the decision process. For instance, if a HTRW or MMRP project has a completed or nearly completed RI/FS, it is appropriate for the District to prepare the estimate because of the information they have regarding what has been accomplished and the future direction of the project. This level of knowledge will often provide the basis for developing a detailed bottom-up estimate using a tool such as MCACES. In these cases, use of a parametric estimate may not be the best tool. The same can be said of a BD/DR or CON/HTRW project with a completed or nearly completed RmD. If the District wishes to assign these types of projects to the CX, the District must coordinate with CX personnel to provide the CX with information necessary to develop the estimates. Once the District has finalized the estimate assignment responsibilities, the list will become available to the Division FUDS Program Manager for review, revision, and approval.

6.6.4.2. Division FUDS Program Managers will either accept or override the District assignments in FUDSMIS. With the exception of pre-decisional MMRP and MMRP/CWM

¹² Pre-decisional MMRP Projects addressing Chemical Warfare Material (CWM) are not estimated using *RACER* because appropriate cost models do not exist in the software.

projects defaulted to the CX at HQUSACE direction, Divisions can accept all District assignments or disapprove and reassign CTC estimate development responsibilities on a project-by-project basis. Reassignment of pre-decisional MMRP and MMRP/CWM projects defaulted to the CX requires approval by HQUSACE. Once the Division finalizes the estimate assignments in FUDSMIS, the list will be considered “approved”.

6.6.4.3. After District and Division finalization, changes in estimate development assignment can only be made by coordination between the Division, District, and the HTRW CX. These CX reassignments will appear in the FUDSMIS Estimate Assignment screen under the column headed with “Div Est”. The CX will annotate in the Comments field specifics of the change, including who requested the revision and the reason why.

6.6.4.4. The project assignments are always available in FUDSMIS to review assignments or check the status of projects. FUDSMIS updates the estimate assignment screen nightly. If a project is added to, or deleted from, the estimate assignment screen, FUDSMIS will automatically email the appropriate District and Division FUDS Program Managers and the HTRW CX. Due to time and resource constraints, Projects added to the assignment list late in the process and prior to the April POM exhibits download may remain uncoded until the next estimate development cycle. These uncoded Projects will not be included in the POM Distribution calculation, the current year environmental liability report, and the BY AWP.

6.7. Development of Estimates.

6.7.1. General

6.7.1.1. The District FUDS Project Manager (PM), as head of the Project Delivery Team (PDT), leads a multidisciplinary team brought together to support the planning, programming, budgeting, execution, and reporting for the FUDS project. Membership on the team should encompass all disciplines needed for project performance.

6.7.1.2. The Project Manager will assign estimate development responsibility to a member of the team or will determine if a project is suitable for indexing. The team member assigned estimate development responsibility could be an in-house Cost Engineer, a contractor, a USACE CX member, or others that are knowledgeable of the project, trained in auditing principles, and experienced in developing CTC estimates. Estimates will be developed and/or updated in current year dollars. Refer to ER 200-3-1, Appendix E, Sections E-6 through E-9.

6.7.1.3. Project estimates must include references and background information for the property and project the estimate is being developed for. To accurately represent the Government’s environmental liability, the estimate must include documentation on phases selected, technologies included in each phase, quantities selected, and any assumptions made in developing the estimate.

6.7.1.4. Appendix B of this *Handbook* contains the guidance document entitled “**Instructions For Developing FUDS CTC Estimates**”. These Instructions provide a standard along with directions and systematic procedures for developing CTC estimates with the *RACER*

software. While these instructions were written for estimates developed in RACER, they are applicable to estimates developed using methods other than RACER. Following these instructions will allow Districts to develop estimates that are creditable, defensible, and able to pass the Quality Control, Supervisory, and Quality Assurance Reviews discussed below. Further, in order to use the software utility discussed in paragraph 6.11.5.2. to upload phase cost information into FUDSMIS, the phase naming conventions and other requirements outlined in these Instructions must be strictly followed.

6.7.1.5. Paragraph 6.2.3. requires USACE Districts prepare annual CTC estimates for all approved FUDS projects that have not reached project completion, as defined in the paragraph. However, in certain cases, USACE has actively sought regulatory concurrence for projects requiring such and is awaiting action by the lead regulatory agency. In these cases, no further USACE action is anticipated, no environmental liability exists, and therefore, no CTC estimate is required. In these cases, the FUDSMIS Project level Current Status field, which is located in the project comments screen, will be used to annotate this status by inserting the following statement:

“The District has actively sought regulatory concurrence for this project and is awaiting action by the lead regulatory agency. USACE has determined no environmental liability exists for this project and therefore, no CTC estimate was developed.”

This step will not be used for Projects for which USACE has not actively sought regulatory concurrence. For these projects, Districts should develop a PCO phase estimate and include this project in the District’s Quality Control and Supervisory Review process.

6.7.2. Indexing of the FUDSMIS LCP Data.

6.7.2.1. As discussed in paragraphs 6.3.2. and 6.6.1, not all projects are suitable for Indexing. For those that are, the process of Indexing will use the CTC information from the previous year’s submittal as a basis for revising the LCP data in FUDSMIS. Indexing will occur in late March each year and will consist of replacing the phase level in-house and contract amounts for the budget year and all outyears with new values changed by the appropriate Indexing multiplier.

6.7.2.2. Since the FUDSMIS LCP data will change but the estimate documentation (i.e., the estimate, QC Review Checklist, and Supervisory Review Checklist) will not, FUDSMIS will provide a narrative description of the Indexing process that is available from the Estimate Assignment Screen. The FUDSMIS narrative and this **Handbook** will provide the basis and rationale for Indexing.

6.7.3. Estimates Developed by the Centers of Expertise.

6.7.3.1. Estimates assigned as CX will be prepared by either the HTRW or MM Centers of Expertise by CX cost engineers or under contract. In-house CX or contract estimators will request from the District FUDS Program Manager specific information that will be the basis for

estimate development. Estimates will be developed that include all appropriate project phases for the project category as shown in ER 200-3-1, Table 4-4.

6.7.3.2. Pre-decisional MMRP projects assigned to the HTRW CX will be developed using the Military Munitions Range data in FUDSMIS. These estimates will be developed using the approved set of assumptions. Appendix I of this *Handbook* contains the guidance document entitled “***Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects***”.

6.7.3.3. The MM CX will develop the CTC estimates for MMRP Chemical Warfare Materials (CWM) projects and will provide the updated estimate to the District who must perform the Quality Control and Supervisory Reviews and make the appropriate entries into FUDSMIS.

6.7.3.4. CX developed estimates will undergo an internal CX QC Review. Following successful completion of this review, the estimates will be provided to the Districts for their Quality Control and Supervisory Reviews. District Quality Control Review comments will be addressed by the CXs and, if necessary, the estimates revised. Once the estimates have passed the Quality Control, the project estimate will be uploaded and attached to FUDSMIS using the FUDSMIS utilities Referenced in paragraph 6.11.5.2. In addition, the CX will provide the final estimates to the District.

6.8. Cost Estimating Systems – How to select the correct estimating tool. The use of automated cost estimating systems enhances the efficiency, accuracy, and credibility of CTC estimates. Automation assists in the standardization of estimating procedures and provides estimates that are easily reviewed, revised, and adapted to new projects or situations. However, automation is just a tool and must not take the place of professional cost engineering knowledge or judgment. The cost estimator should always be knowledgeable of the system’s capabilities and limitations in relation to a project. The cost estimator must be especially careful when using models and when adapting cost estimates to new projects to ensure that there are neither duplications nor omissions in the estimate. Output should be checked for reasonableness, and assumptions and methodology should be verified and documented. The best-automated system is not a replacement for good estimator judgment. Available cost estimating software programs to develop FUDS CTC estimates are discussed below.

6.8.1. *Remedial Action Cost Engineering and Requirements*[®] (*RACER*[®]).

6.8.1.1. *RACER* is a parametric estimating tool that can develop FUDS CTC estimates for all project phases, from characterization through final closeout. At a minimum, *RACER* must be used to develop CTC estimates for FUDS HTRW and MMRP projects before the decision document is finalized and for CON/HTRW and BD/DR projects before the design is completed.

6.8.1.2. *RACER* was accredited in accordance with DoD Instruction 5000.61, Modeling and Simulation Verification, Validation, and Accreditation (VV&A). *RACER* provides an automated, consistent, and repeatable method to estimate and document the program costs for environmental cleanup of contaminated sites, and to provide a reasonable cost estimate for

program funding consistent with the information available at the time of the estimate preparation.

6.8.1.3. *RACER* is used primarily to develop budgetary cost estimates in the early stages of project response actions when details are limited or not available. *RACER* uses generic cost models of cleanup systems based on historical project information and technologies to develop costs for response actions. The estimator should modify these generic models to reflect actual project conditions. These tailored models are then quantified and pricing is updated in accordance with the budget year costing data using a commercial environmental unit price book as a base. *RACER* will estimate costs for studies, design, remedial action, operation and maintenance, and long-term management. The most recent version of *RACER* should be used by USACE when developing FUDS CTC estimates, unless otherwise approved by HQUSACE.

6.8.2. *Micro Computer-Aided Cost Engineering System*[®] (*MCACES*[®]). *MCACES*, and its successor *MII*, is the standard detailed cost estimating system used by all District Cost Engineering offices. Primarily, it is used for cost estimates where detailed design information is available. *MCACES* includes a Unit Price Book (UPB) database that contains cost information on more than 21,000 unit price line items for construction labor, equipment, and material.

6.8.3. *Excel Spreadsheets*. Excel provides a powerful tool for development of estimates. It is used for both less complex projects and for CWM projects for which models do not exist in *RACER*. Since the structure of an Excel spreadsheet is not standardized, risk exists that the estimates will not be properly constructed or documented. Documentation, in the form of notes and explanation, must be entered into cells in the spreadsheet to support the requirements for replicability and traceability from the source document as well as provide narratives to support unit prices, quantities, and formulas. Because of these limitations, Excel spreadsheets should only be used for simply projects where the sophistication of *RACER* or *MCACES* is not appropriate or for CWM projects where *RACER* models are not available.

6.9. An Overview of the Quality Review of CTC Estimates.

6.9.1. Districts use a Quality Control Plan, which may be a part of the overall District Quality Management Plan, to identify the details and frameworks of building quality into their process of developing FUDS Project CTC estimates. They then develop the CTC estimates according to the plan, adapting to changing conditions and modifying their plans to ensure CTC estimate development quality objectives are met. Districts perform independent Quality Control Reviews and Supervisory Reviews of **each** estimate to ensure that the stated quality objectives are being met. The objective of the Quality Control Review is to review the estimate from a technical point-of-view, to ensure that the estimate is properly constructed, reflects what is known about the project, and is representative of the project, and that the person developing the estimate is qualified by experience and training. The objective of the Supervisory Review is to ensure the estimate includes only appropriate future costs and is accurately reflected in the Life-Cycle Plan in FUDSMIS.

6.9.2. Divisions conduct periodic in-progress and After Action Quality Assurance Reviews to evaluate the District's Quality Control processes, to share lessons learned, and to facilitate continuous improvement. During these reviews, Divisions use management oversight

and verification to identify obstacles preventing Districts from developing quality CTC estimates. Divisions systematically analyze the District's processes to identify problems affecting the development of CTC estimates. Specific corrective actions are taken to remove these barriers and to incorporate improvements leading to a refinement of the overall quality of the CTC estimates.

6.9.3. This handbook provides the basic framework upon which Quality Control and Supervisory Reviews are conducted. Offices performing Quality Control and/or Supervisory Reviews should develop and use a Quality Control and Supervisory Review Plan that identifies roles and responsibilities, estimate assignment and development requirements, review methods and procedures, archiving procedures, and other relevant steps. The Qualification Statements for HTRW CX and MM CX personnel included in Appendix E of this *Handbook* should be appended to the District's Quality Control Plan if CX personnel are to be directly involved in the development or QC Review of estimates for a specific District.

6.9.4. The Quality Control Review and Supervisory Review Checklists will be completed and recorded within FUDSMIS. The questions contained in these two checklists along with instruction on how to answer the checklist questions are included in Appendices C and D, respectively. Following completion of each review, the reviewer will electronically sign their form in FUDSMIS to signify their agreement with the findings represented on the forms.

6.9.5. Following the successful completion of the Quality Control and Supervisory Reviews and until the download within FUDSMIS for the POM Exhibits during the first week in April each year, FUDSMIS will be used to monitor changes in the BY and beyond portion of the LCP. If the District attempts to add or delete phases or change phase amounts in the BY and beyond portion of the LCP by more than \$100, FUDSMIS will advise that doing so will invalidate the QC and SR checklists. If the District continues with the change in FUDSMIS, the existing CTC estimate must be revised or a new estimate prepared, the QC Review conducted, the phase cost data entered into FUDSMIS, the new or revised estimate attached to FUDSMIS, and the SR conducted for the new or revised estimate.

6.9.6. Successful completion of the Quality Control, Supervisory, and Quality Assurance Reviews for each FUDS project estimate is critical. Only those approved FUDS projects (see paragraph 6.2.3.) that have successfully passed the Quality Control Review, the Supervisory Review, and the Quality Assurance Review process prior to preparation of the POM exhibits in early April will be: (a) used to determine the initial fiscal allocation of FUDS funding to each RBC for updating the Future Year Defense Plan/Life Cycle Plan (refer to ER 200-3-1, paragraph 6-1.1.2.1), (b) included in the approved BY Annual Workplan, and (c) reported in the current year FUDS Environmental Liability Report.

6.9.7. Figure 3 illustrates the framework of estimate assignment, preparation, and review for new and revised estimates where Indexing is not an appropriate option.

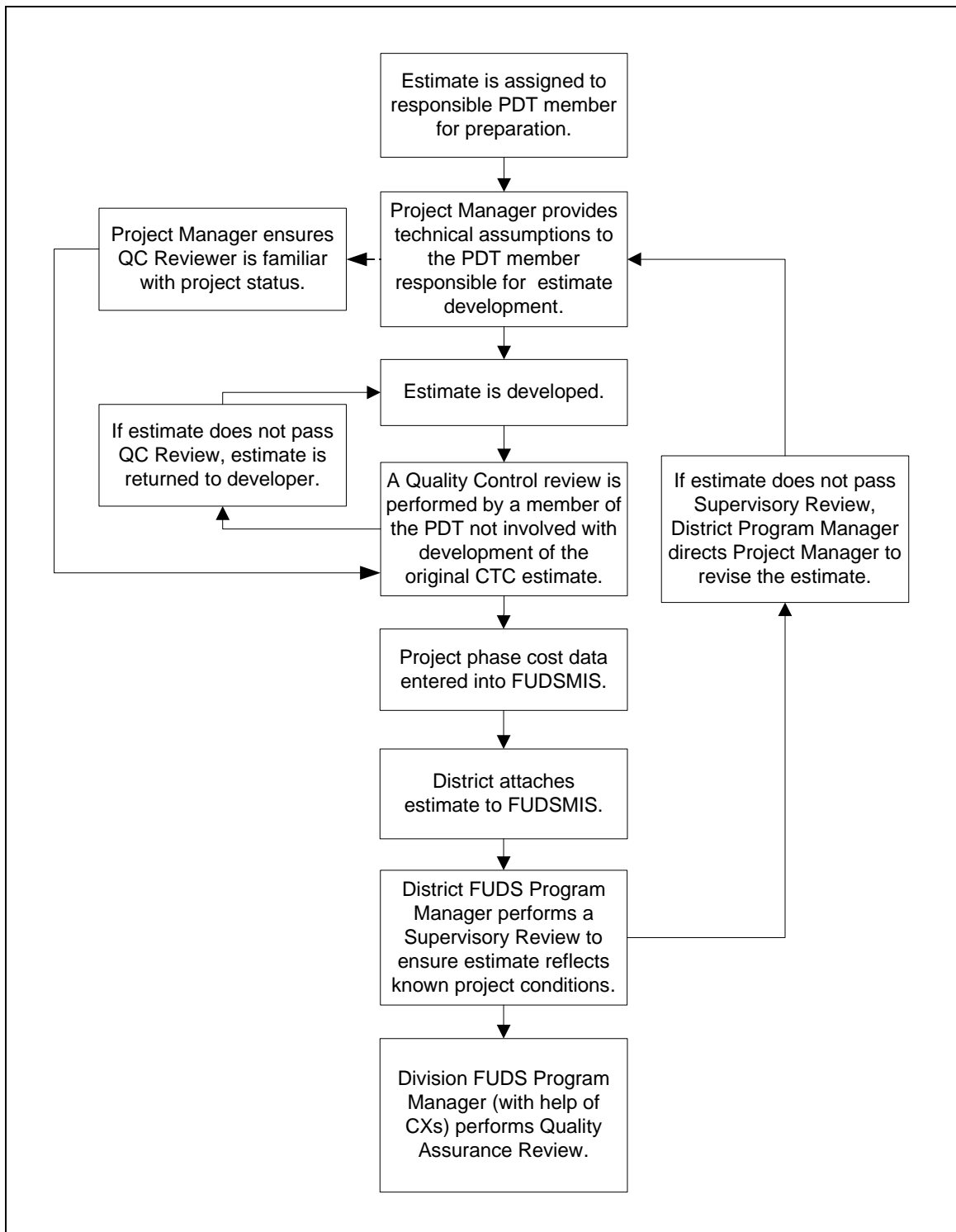


Figure 3. Framework of Estimate Assignment, Preparation, and Review for New and Revised Estimates where Indexing is not an Option.

6.10. Quality Control Review.

6.10.1. The Project Manager (PM) is responsible to ensure quality in the developed estimate. As head of the quality control team, the PM will assign responsibility for the Quality Control Review to an independent member of the PDT not involved with the development of the original estimate. The QC Reviewer will review the estimate from a technical point-of-view to ensure that the estimate is properly constructed and the person developing the estimate is qualified by both education and experience. This education must include successful completion of an FUDS Environmental Liability training that is offered annually through the HTRW CX. The PM must ensure the QC Reviewer is current with the status and other issues related to the project. FUDSMIS contains a table of USACE personnel that have successfully completed the FUDS Environmental Liability Training and will limit the QC Review to be performed only by personnel in this table.

6.10.2. A Quality Control Review screen is available in FUDSMIS to record the responses to the questions shown in Appendix C. Entering the CTC estimate into FUDSMIS occurs following successful completion of the QC Review. Successful completion of the Quality Control Review is a predecessor requirement before the Program Manager can perform the Supervisory Review on the project estimate as discussed below.

6.10.3. Question 1 of the QC Checklist asks if the current estimate total for the BY and beyond varies by more than 10% of the previous entries in the LCP for the same period. If the answer to this question is “YES”, FUDSMIS requires a selection from one or more of the three drop down lists that provide technical, regulatory, or estimating reasons. Successful completion of the QC Checklist is not dependent on the answer to Question 1.

6.10.4. For all Projects that satisfy the requirements of paragraph 6.3.2 and are assigned as Indexed (either by default or by assignment by the District or the CX), FUDSMIS will populate the entries in the Quality Control Screen as indicated below:

- Question 1 will be populated with “NO”.
- Questions 2 through 6 will be populated with “YES”.
- The Comment field will be populated with “The official QC checklist for this project is available on PIRS. This form is being used to summarize the results from the official checklist.”¹³

6.10.5. The Quality Control Review must be completed such that the district conducted Supervisory Review and the CX conducted Quality Assurance Review can all be completed prior to the download within FUDSMIS for the POM Exhibits the first week in April (see the schedule in Table 2).

¹³ This comment will only be inserted during the FY2007 estimate development cycle and only for those projects with estimates prepared during prior years and the Quality Control and Supervisory Review Checklists exist on PIRS.

6.10.6. Following the successful completion of the Quality Control Review, the District must upload the phase cost information contained in the estimate to FUDSMIS and attach the estimate to FUDSMIS. Phase cost data may be uploaded manually into the LCP for all types of estimates. For RACER generated estimates, phase cost data can be automatically uploaded into the LCP. Paragraph 6.11. provides information on tools in *RACER* and FUDSMIS the Districts can use to facilitate these two steps.

6.11. Archiving of CTC Estimate.

6.11.1. Since the Quality Control, Supervisory, and Quality Assurance Reviews will be performed within FUDSMIS, FUDSMIS will be used to electronically archive the results of these reviews.

6.11.2. Following the successful completion of the Quality Control Review, Districts must enter the phase cost information into FUDSMIS, place a copy of the estimate in the permanent Project File, and attach a single file that contains the estimate to FUDSMIS.

6.11.3. The type of file that is attached to FUDSMIS will vary with software that is used to develop the estimate and include the following:

6.11.3.1. For estimates developed with *RACER*, attach the *RACER* Estimate Documentation Report that matches the CTC entered in the LCP.

6.11.3.2. Estimates not developed in *RACER* must also be attached to FUDSMIS. FUDSMIS will only allow files types with doc, rtf, xls, and pdf¹⁴ file extensions to be attached to FUDSMIS. These non-*RACER* estimates must show project costs by phase with a total CTC amount and meet the standard outlined in Appendix B of this *Handbook* that contains the guidance document entitled “*Instructions For Developing FUDS CTC Estimates*”.

6.11.4. To allow information to be organized in FUDSMIS, Districts need to have the electronic files named correctly. The file naming convention for the estimates is as follows:

PropNum_ProjNum_FY07_CTC.(xls)(doc)(pdf)(rtf)

Example:

C02NJ0084_02_FY07_CTC.xls

6.11.5. The following tools are available for use by Districts to expedite and facilitate the processes discussed above:

6.11.5.1. *RACER Post Processor Utility*. This utility is a component of the *RACER* software and is used to facilitate the uploading of phase cost data to FUDSMIS. This tool can be

¹⁴ Files with these extensions are created by Microsoft Word (doc and rtf), Microsoft Excel (xls), and Adobe Acrobat (pdf) applications.

accessed from the Utility Menu in *RACER*. The utility will create an electronic file in extended markup language (xml) format for uploading to FUDSMIS using the *RACER* to FUDSMIS Upload Utility discussed below. The xml file will contain the FUDS Property Number, FUDS Project Number, Phase, Year, In-House Amount, and Contract Amount for each project selected from the *RACER* database for post processing. Instructions on the use of this utility are provided in the *RACER* Help system.

6.11.5.2. *RACER to FUDSMIS Upload Utility*. FUDSMIS provides the capability to automatically upload to the Project LCP the phase cost information in the xml file produced by the *RACER* Post Processor Utility discussed above. The utility allows the user to browse to locate the xml file on their computer containing the *RACER* data to be uploaded. Once the xml file has been located, the upload utility will replace the existing phase cost data in the LCP with the data in the *RACER* upload file. The phase costs in the upload file will be proportionately placed in the same year(s) as shown in the existing project plan. Prior to uploading to the LCP, the utility will perform quality checks to ensure the estimate includes appropriate phase names and phase types for the category of FUDS project.

6.11.5.3. *RACER Estimate Documentation Report (EDR) Batch Export Utility*. A stand-alone utility is available which will quickly generate *RACER* Estimate Documentation Reports for archiving on FUDSMIS. To operate the utility, the user selects a *RACER* database containing one or more *RACER* estimates to be archived on FUDSMIS. An EDR will be generated for each project selected within the database. The individual EDR files will be named in accordance with the FUDSMIS file naming convention described above. These files can then be attached to FUDSMIS for archiving purposes.

6.11.5.4. *FUDSMIS Estimate Attachment Utility*. An electronic copy of each estimate supporting the LCP must be attached to FUDSMIS for archiving purposes. These files must be uploaded to FUDSMIS using a utility within FUDSMIS. After opening the utility, the user will be asked to identify a folder on the users computer where the files to be uploaded are located. These files must be named in accordance with the naming convention described above. Any file that is not appropriately named will be rejected.

6.12. Supervisory Review.

6.12.1. Supervisory Review is performed by the District FUDS PgM after the Quality Control Review is complete, the estimate data has been entered into the LCP, and the estimate has been attached to FUDSMIS. The PgM must conduct the Supervisory Review within FUDSMIS. Within the District, the PgM is the functional equivalent of the supervisor of Project Managers executing FUDS projects. As functional head of the FUDS program within the District, the PgM has familiarity with the projects being reviewed and has equivalent qualifications of the PM. FUDSMIS will contain a table of USACE personnel designated as the District FUDS PgM and alternates. FUDSMIS will limit the Supervisory Review to be performed only by personnel in this table.

6.12.2. For all Projects that satisfy the requirements in paragraph 6.3.2. and are assigned as Indexed (either by default or by selection by the District or the CX), FUDSMIS will populate the entries in the Supervisory Review screens as indicated below:

- Questions 1 and 2 will be populated with “YES”.
- The Comment field will be populated with “The official Supervisory Review checklist for this project is available on PIRS. This form is being used to summarize the results from the official checklist.”¹⁵

6.12.3. Successful completion of the Supervisory Review requires the answers to both Questions 1 and 2 be answered as “YES”. Answering Question 1 of the Supervisory Review Checklist as “NO” indicates the Project estimate was not properly prepared or did not reflect only future work. Therefore, when the Supervisory Review Checklist is saved with Question 1 answered “NO”, FUDSMIS will automatically blank the answers to the six QC Review Checklist Questions for that estimate. This will necessitate the estimate be corrected and the Quality Control and Supervisory Reviews to be performed again. Answering Question 2 of the Supervisory Review Checklist certifies whether the phase total amounts in the FUDSMIS LCP the amounts in the estimate. If the phase totals do not match, the LCP in FUDSMIS must be edited to agree with the estimate in order for the question to be answered with a “YES”.

6.12.4. Following the successful completion of the Quality Control and Supervisory Reviews and until the download within FUDSMIS for the POM Exhibits during the first week in April each year, FUDSMIS will be used to monitor for changes in the BY and beyond portion of the LCP. If the District attempts to add or delete phases or change phase totals in the BY and beyond portion of the LCP by more than \$100, FUDSMIS will advise that doing so will invalidate the QC and SR checklists. If the District continues with the change in FUDSMIS, the CTC estimate must be revised, the QC Review conducted, the phase cost data entered into FUDSMIS, the revised estimate attached to FUDSMIS, and the SR conducted on the revised estimate.

6.13. Quality Assurance Review.

6.13.1. Following the completion of the Quality Control and Supervisory Reviews of the FUDS project estimates, the USACE Division will perform a Quality Assurance Review of the estimate development process for their Districts. Within the Division, the FUDS Program Manager will lead this effort, often assisted by the USACE Centers of Expertise.

6.13.2. The QA Review will consist of the following:

6.13.2.1. Performing a Quality Assurance review of each District’s projects to verify that each project has an archived estimate that supports the LCP. This information will be available FUDSMIS for CX and District assigned projects. During FY07 for projects assigned as indexed,

¹⁵ This comment will only be inserted during the FY2007 estimate development cycle and only for projects assigned as indexed. The official Quality Control and Supervisory Review Checklists for these projects exist on PIRS.

this archived information will be found on PIRS. Starting in FY08, this information will be available within FUDSMIS.

6.13.2.2. Comparing the project phase total amounts in FUDSMIS to the phase total amounts from the prior year estimate. This will ensure there is no phase level difference greater than \$100 between the BY and out portion of the FUDSMIS LCP and the supporting estimate.

6.13.2.3. Reviewing and statistically testing a representative percentage of estimates. In the third portion of the QA Review, the CX will concentrate on the process, rather than individual estimates. This will be achieved by reviewing and testing a statistically representative percentage of the project estimates to ensure the estimates meet estimating and accounting standards, are documented, provide an audit trail, and estimate preparers are properly trained and experienced. The QA Review will identify actual or potential weaknesses that are to be addressed before the start of the CTC estimate development in the following year. This portion of the QA Review will be recorded and archived in FUDSMIS. Appendix F contains the CX Quality Assurance Plan and QA checklist for performing the QA Review.

6.13.3. Preliminary results of the QA Review will be provided to the Districts prior to the April data call to enable the Districts to take appropriate actions to successfully complete the CTC process.

6.13.4. Following completion of the Quality Assurance Review, the Division will develop an After Action Report containing the findings of their process review. The completed Report will be provided to HQUSACE. If the CXs assisted the Divisions in their QA Review, the CX will provide input to the Division After Action Report.

6.13.5. Qualification statements for HTRW CX and MM CX personnel involved in the QA Review are provided in Appendix E.

6.14. Locking of the non-current year LCP in FUDSMIS for the Environmental Liability Report (ELR).

6.14.1. In early July each year, a copy of the LCP table is made within FUDSMIS. The information in this table is used to report the environmental liability of the FUDS program for that year. The FUDS environmental liability reported at this time is subject to future audits. Therefore, it is critical that the Project liabilities contained in this environmental liability report are supported with properly prepared and reviewed CTC estimates. The quality reviews discussed above that were conducted prior to the early April POM exhibit download must not be invalidated by changes to the LCP. To accomplish this, FUDSMIS was revised to prevent changes to the BY and beyond portion of the LCP during the early April to early July timeframe.

6.14.2. This “locking” of the LCP will prevent the addition or deletion of phases or the changing of phase amounts exceeding \$100 in the BY and beyond for the projects that will be included in the ELR. Districts and Divisions will continue to have full control of the CY workplan during this period to manage and execute their program. In order to develop POM balanced workplans, Districts will be able to shift dollars within phases between the BY and future years. However, no movement of funding will be allowed between phases within a project or between projects. Following the early July download to report environmental liabilities, the LCP will be unlocked allowing Divisions and Districts to revise the LCP subject to HQUSACE guidance on allowable changes in the approved BY workplan.

6.14.3. Only FUDS Projects that are to be included in the ELR will be affected by this “locking” of the LCP. Refer to paragraph 6.9.6., above, for a discussion of which projects are so affected.

7.0 Points of Contact. The following personnel are the primary points of contact for CTC estimate preparation, review, and overall coordination at HQUSACE and the CXs.

7.1. HQUSACE.

Julian Chu
HQUSACE FUDS Program Manager
CEMP-DE
202-761-1869

7.2. HTRW Center of Expertise.

Thomas Pfeffer – Overall FUDS Program Support
HTRW CX FUDS Program Manager
CENWO-HX-M
402-697-2620

Katherine Peterson – Overall CTC Support and Outyear MMRP Estimates
HTRW CX Cost Engineer Team Lead
CENWO-HX-E
402-697-2610

POCs for Divisions and Districts:

Steve Butler – For SPD and SWD Divisions and Districts
HTRW CX Cost Engineer
CENWO-HX-E
402-697-2656

Rick Osborn – For POD, NAD, and NWD Divisions and Districts
HTRW CX Cost Engineer
CENWO-HX-E
402-697-2426

Terry Tomasek – For SAD and LRD Divisions and Districts
HTRW CX Cost Engineer
CENWO-HX-E
402-697-2590

7.3. Military Munitions Center of Expertise.

Jason Adams – For MMRP/CWM and active MMRP estimates
Cost Engineer
CEHNC-ED-ES-C
256-895-1556

Appendix A References

A-1 United States Statutes.

10 USC §§2701-2708, §2710, §2805

Defense Environmental Restoration Program.

42 USC §§9601-9657

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986601-9657

PL 101-576

Chief Financial Officers Act of 1990.

PL 103-356

Government Management Reform Act of 1994.

PL 103-62

Government Performance and Results Act of 1993, 3 August 1993.

PL 104-208

Federal Financial Management Improvement Act of 1996, 31 USC §3512.

Annual Defense Appropriation and Authorization Acts

Environmental Restoration Account Appropriations.

A-2 Federal Regulations

40 CFR Part 300

National Oil and Hazardous Substances Pollution Contingency Plan.

Federal Accounting Standards Advisory Board (FASAB), Statements of Federal Financial Accounting Standards (SFFAS) No. 5

Accounting for Liabilities of the Federal Government.

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Accounting for Property, Plant, and Equipment.

A-4 Department of Defense Publications**DoD Instruction 5000.61**

DoD Modeling and Simulation Verification, Validation, and Accreditation (VV&A), 29 April 1996.

DoD Instruction 7000.14R

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Improving the Report of Environmental Liabilities, DAIM-AZ Memorandum, 18 November 2004

A-6 USACE Publications.**ER 200-3-1**

Formerly Used Defense Sites (FUDS) Program Policy

ER 1110-3-1301

Cost Engineering Policy Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW)—Remedial Action Cost Estimate.

Appendix B

Instructions for Developing FUDS CTC Estimates

These Instructions provide directions and systematic procedures for developing and updating CTC estimates with the *RACER* software. Following these instructions will allow you to develop estimates that are creditable, defensible, and able to pass the Quality Control, Supervisory, and Quality Assurance Reviews. Further, in order to use the *RACER* Post Processor and Batch Upload Utilities, **the phase naming conventions and other requirements outlined in these Instructions must be strictly followed.**

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INSTRUCTIONS FOR DEVELOPING FUDS CTC ESTIMATES

In an effort to aid the districts in developing creditable and more defensible estimates for the FUDS program, the following instructions are provided. In addition, these instructions include step-by-step procedures and requirements for developing cost to complete (CTC) estimates with the RACER software. The RACER software is released each year with enhanced functionality; therefore, some of the functionality and screens may have been modified since the completion of this document. The instructions incorporate items of concern with previous CTC estimates that surfaced during the recent audits. The intent of this document is to enhance the estimating process to help the districts pass future audits of the FUDS program.

1.0 Updating Previously Developed Estimates for Projects to Current Year Dollars

An estimate that has been developed and submitted previously is often the starting point of completing a cost to complete estimate. A previously developed estimate that will be used for the current years submission must always be updated to reflect current year pricing. In addition, some previously developed estimates have changed site conditions, these estimates also must be updated to current year dollars and the estimate revised to reflect the current site conditions. The following instructions will provide information on how to update a previously developed estimate to current year dollars. Revision of the estimate should be done in accordance with Section 2 for developing an estimate.

For project estimates created in MCACES and EXCEL, the details of the estimate must be reviewed to determine if the escalation factor from the year the estimate was created to the current year is applicable and if applicable the escalation factor must be added to the estimate. Escalation factors are provided from headquarters.

For project estimates created in RACER adding an escalation factor is not necessary if the estimate is “updated” in the most current version of RACER. Updating an estimate in RACER re-prices the estimate in current year dollars by re-pricing all the RACER assemblies used in the estimate to the current pricing that is incorporated in the RACER assembly database.

To update a RACER estimate, first the most current version of RACER must be installed then the estimate needs to be brought into this version. Changing to the database that your project estimate is in or importing the project estimate will make the estimate available for updating. The RACER system will first upgrade the estimate. Upgrading essentially makes the estimate viewable within the new version of RACER. NOTE this does not update prices.

Once the database is in the newest version of RACER the project estimate can be updated to current assembly database prices, which results in updating your estimate to current year dollars. To update the projects, the user may be prompted when installing the software for the first time or the user can go to the Utility Menu and Select Update

Property (LEVEL 1) Costs. A screen with a tree, similar to the main RACER screen, is displayed. You can select all projects or specific projects. This can be accomplished by clicking the check boxes at any level of the tree. Clicking the checkbox at the folder level selects all the projects in the folder. Clicking the RACER checkbox selects all projects. Un-checking the check boxes deselects projects in the same manner. Buttons at the bottom of the form can also be used select all projects or deselect all projects. When the Accept button is clicked, costs are updated for the selected projects. Once costs are updated in a project estimate, it is not possible to return to the original project costs, unless a copy of the estimate is available.

In addition to updating project estimates to current year dollars, an estimate may require additional updating to capture model changes. Updating to capture model changes is not required but is preferred if the estimate has not been customized. Each year some models may have changed from previous versions, to capture these changes requires unique update procedures. A complete list of models that have changed in RACER will be noted in the “What’s New” section of the RACER Help Manual. The changes to models will not be incorporated in the estimates until the particular model is re-ran. When updating a previously reviewed and submitted estimate the model changes should be reviewed to determine if the changes should be incorporated into the estimate. To include the changes in a model, the model must be re-run. To re-run a model the user will have to go into a secondary parameter screen, change a secondary parameter selection and then change it back in order to activate the “accept” button. It’s critical that the user change a secondary parameter and not a required parameter because if a required parameter is changed it will change any secondary parameter back to its original default. Once the accept button is activated push accept, save and close the model. As an alternate method, the user may choose to re-run a model by re-entering **all** the required and secondary parameters.

Project estimates that have site condition changes that result in changed quantities or treatment trains should be completed similar to the following section on developing an estimate.

2.0 Instructions for Developing CTC Estimates

The following are general instructions for developing more creditable and defensible RACER CTC estimates. This document outlines specific requirements that must be incorporated in the RACER estimates in order for electronic uploading of the estimate into FUDSMIS. To electronically upload estimates to FUDSMIS, a “post processor” within RACER or external to RACER is used. The Post Processor is a utility feature that provides the district a report, which shows the estimate phase cost and their associated start dates as determined from the estimate. The Post Processor also provides an electronic “Access” file that can be used to electronically upload phase costs into FUDSMIS. These specific requirements are shown in ‘***bold italic***’. Please ensure the RACER generated estimates have these requirements incorporated.

- **RACER Preferences:** - In developing FUDS CTC estimates using RACER, the Preference feature in RACER must be utilized. The specific preferences that must be utilized are the **Level Names, Level Two Types, and the Markup Templates**. Preferences in RACER must be modified or imported to ensure correct FUDS nomenclature is used for the level names and that the correct project categories are added to the level two types. The Level Names in the preference in RACER are as follows: Level One will be called “FUDS Property”, Level Two will be called “Project” and Level Three will be called “Phase”. Level Two Types include the following selections: MMRP, HTRW, CON/HTRW, BD/DR, and PRP. Also, the RACER Preference menu is where the Markup Templates are added. The Markup Templates to be utilized are in Paragraph 1.3, Table 2. The FUDS specific Preferences and Markup Templates can be obtained from the HTRW-CX and can be imported into RACER. If you need the import file contact Rick Osborn at (402) 697-2426. In addition, if the district has specific Markup Templates created to support their district, they can be utilized as well. The main point is that the RACER default Markup Template cannot be used because it does not include enough owner costs and it contains zero contingencies.
- **Folder Names** – Folders (Level 0 in the RACER hierarchy) will be named using the three-letter abbreviation for the USACE District. Example: Omaha District would be ‘NWO’.
- **Level Names** – As described above in “RACER Preferences”, the default names for the first three RACER estimating levels will be standardized as follows as a result of importing the preferences into RACER or manually changing the level names:
 - Level 1 – FUDS Property
 - Level 2 – Project
 - Level 3 - Phase

2.1 **RACER Level One CTC Estimate Requirements**

- ***The “FUDS Property” field must be the nine digit number assigned to the property as identified in FUDSMIS***
- ***The “FUDS Property Name” field must be as identified in FUDSMIS.***
- The “Date” field must be the date the estimate is being prepared or updated if it is an existing estimate. (This field may be deleted in RACER 2006)
- The “Property” category field input will be <none>.
- “Cost Database” field will utilize <User-Defined Costs> selection in RACER.
- “Reporting Option” field will use the <Fiscal Year> reporting option.
- The “Description” field must contain property level documentation to include various aspects of the property. Much of the information needed to fill out the property description can be obtained from the INPR or other appropriate documents. Required Information that will be captured in the comment field are:
 - A brief narrative that describes the property history
 - Location of property

- Criteria for selection of the location if not an exact match and if for some reason the estimator changes the default location factors, documentation as to the basis for the change must included in the description field
- Other instructions, if any, provided by the District PM
- “Location and Modifiers” will be the state and closest city or installation the project is in or near. If a match cannot be found then the state average can be used. If for some reason the estimator changes the default location factors, documentation as to the basis for the change must included in the description field. However, it is recommended that these modifiers not be changed.
- Level One RACER screen shot example is shown below:

The screenshot displays the RACER software interface. On the left, a sidebar titled 'Display Options' shows a tree structure with folders like 'RACER', 'LKL TEST', 'NW0', 'PIRS Example Project', 'RCRA C Cover', and 'SWT-04'. The main window is titled 'RACER - PIRS Example DatabaseI_700.mdb' and contains a form for entering project data. The form is organized into several sections: 'FUDS Property' with fields for ID, Name, Date, Description, and Category; 'Report Option' with radio buttons for 'Calendar Year' and 'Fiscal Year'; 'Project Costs' with radio buttons for 'Use System Costs' and 'Use User Defined Costs'; 'Location' with dropdowns for 'State / Country' and 'City'; and 'Modifiers' with input fields for 'Material', 'Labor', and 'Equipment'. A note states: 'Note: This option will determine the format of all "Cost Over Time" reports.' At the bottom right, there are 'Save' and 'Close' buttons.

2.2 RACER Level Two CTC Estimate Requirements

Within RACER there are now two ways to create a new estimate, either manually or through the use of templates. In either case, the fields and screen shots shown below are examples of what must be filled out to make the estimate fully documented. The RACER screen shots shown below are based on using the “manual” method to setup the estimate. If the “template” method is used, the basic screens will look the same, and required information will also be the same. The only difference is that when using the template method the phase names will be established with the correct FUDS nomenclature for the user. It is recommended that the template method is used to set-up new estimates.

- ***The “Project ID” field must be the two-digit number assigned to the project as identified in FUDSMIS.***
- ***The “Project Name” field must be as identified in FUDSMIS.***
- The “Initial Phase Start Date” field is used to populate the phase start dates at level 3, the phase level. The project or program manager should determine these dates. If a previous estimate is being updated or revised, these dates should be reviewed for accuracy and changed appropriately.
- ***The “Project Type” field input must be that of the type of project being estimated as identified in FUDSMIS (MMRP, HTRW, CON/HTRW, BD/DR, PRP).***
- The “Description” field must contain project level information to document specific aspects of the project, and the estimate being developed. The required data elements that must be captured in the comment field are:
 - District PM name and telephone number
 - Technical Personnel, if applicable, that were instrumental in developing the estimate treatment train etc.
 - Reference documents the estimating team relied upon (e.g., INPR) in developing the estimate
 - Reasons for the change from the last reported estimate. The following are typical examples of changes that should be documented;
 - A phase was completed therefore removed from the estimate.
 - A phase was added due to changed conditions. Explain the change conditions.
 - The technologies within a phase were added, deleted or modified due to changed conditions.
 - The project estimate was updated to current year dollars and no other changes were made
 - Other narrative descriptions that describe the project (project history, media and contaminate being remediated, assumed approaches, etc.)
 - Other instructions, if any, provided by the District PM
- Level two of the RACER hierarchy is where the user establishes which phases to include in the estimate and the phase start dates. Phases at this level will include only those phases relevant to the type and status of the project being estimated. Please coordinate with project manager to see what phases are applicable for the project being estimated. Table 1 below, shows the FUDS nomenclatures for phase names as compared to the standard RACER phase names. Also, refer to Table 4-4 of the FUDS ER 200-3-1 to ensure applicable phases are included for specific project types. If the “manual” method is chosen to create the estimate, these FUDS phase names will have to be entered at level three of the estimate. Again, if the “template” method is used, the correct phase names will be defaulted for the user depending on the project category. However, the user will have to decide which phases are applicable to the project. For example, if the RI/FS phase is complete then you would not want to include this phase in the CTC estimate and it should be de-selected in the standard template.

Table 1. Phase Naming Conventions

FUDS Program Phase	RACER Phase
SI	Pre Study
RI/FS	Study
EE/CA	Study
RD	Remedial Design
RmD	Remedial Design
RA-C	Remedial Action
RmA-C	Interim/Removal Action
IRA	Interim/Removal Action
RA-O	Remedial Action Operation
LTM	Long Term Monitoring
PCO*	Site Close Out

*PCO phase is expected to be included on every project that requires regulator concurrence.

Reference the “Estimator” and “Reviewer” Information Tabs shown in the screen shots below. The estimator information is required, in that, if this is not filled out the user cannot proceed with the estimate development. For those users that develop a lot of estimates this information can be stored in a menu selection called “Contact Info”. This information can be automatically populated in the Estimator Information tab by selecting the “Use Contact Information” button. Only one set of contact information can be stored at this menu selection. The Reviewer Information tab is not a required tab to be able to go on in the estimate development process, but is available to document the review of the estimate. This tab was designed to be filled out after the estimate is completed and is being reviewed. There are checks built into the RACER system to ensure that the estimator information and reviewer information is not one in the same. The reviewer can store their contact information on their copy of RACER and populate the reviewer tab the same way.

- Level 2 screen shot examples below:

RACER - PIRS Example Database1_700.mdb

File Reports... Contact Info Help

Display Option: Name

- RACER
 - LKL TEST
 - NwD
 - Atlas Missile Site
 - PIRS Example Project
 - RCRA C Cover
 - SWT-04

Project

Description	Estimator Information	Reviewer Information
Project Definition	Phase Element Names	Phase Element Dates

Project ID: 02

Project Name: Atals Missile Site 2

Project Type: HTRW

Setup Method: Manual

Accept Save Close

RACER - PIRS Example Database1_700.mdb

File Reports... Contact Info Help

Display Option: Name

- RACER
 - LKL TEST
 - NwD
 - Atlas Missile Site
 - Atals Missile Site 2
 - PIRS Example Project
 - RCRA C Cover
 - SWT-04

Project

Description	Estimator Information	Reviewer Information
Project Definition	Phase Element Names	Phase Element Dates

☐ Pre-Study

☒ Study

☒ Design

☐ Removal/Interim Action

☒ Remedial Action

☐ Operations & Maintenance

☒ Long Term Monitoring

☐ Site Closeout

Accept Save Close

RACER - PIRS Example Database1_700.mdb

File Reports... Contact Info Help

Display Option: Name

- RACER
 - LKL TEST
 - NWD
 - Atlas Missile Site
 - Atlas Missile Site 2
 - PIRS Example Project
 - RCRA C Cover
 - SWT-04

Project

Description Estimator Information Reviewer Information

Project Definition Phase Element Names **Phase Element Dates**

Phase Element Types Included

Phase Type	Default Phase Element Start
Study	October 2004
Remedial Design	October 2005
Remedial Action	April 2006
Long Term Monitoring	September 2007

Accept Save Close

These Phase dates are used to initially populate the Level 3 Phase Screen. If the date is changed at the Level 3 Phase Screen it will not be automatically changed here.

RACER - PIRS Example Database1_700.mdb

File Reports... Contact Info Help

Display Option: Name

- RACER
 - LKL TEST
 - NWD
 - Atlas Missile Site
 - Atlas Missile Site 2
 - PIRS Example Project
 - RCRA C Cover
 - SWT-04

Project

Project Definition Phase Element Names Phase Element Dates

Description Estimator Information Reviewer Information

Description

Information specific to the project should be placed here

Accept Save Close

RACER - PIRS Example Database1_700.mdb

File Reports... Contact Info Help

Display Option: Name

- RACER
 - LKL TEST
 - NwD
 - Atlas Missile Site
 - PIRS Example Project
 - RCRA C Cover
 - SWT-04

Project

Project Definition	Phase Element Names	Phase Element Dates
Description	Estimator Information	Reviewer Information

Estimator Information:

Name: John Doe

Title: Cost Engineer

Agency/Organization/Office: USACE

Business Address: 123 Army Corps Street

Telephone Number: (123) 456-7890

E-Mail Address: qoeicxjckruipxcl

Estimate Prepared Date: Sept 04

Clear Use Contact Info

Accept Save Close

RACER - PIRS Example Database1_700.mdb

File Reports... Contact Info Help

Display Option: Name

- RACER
 - LKL TEST
 - NwD
 - Atlas Missile Site
 - Atlas Missile Site 2
 - PIRS Example Project
 - RCRA C Cover
 - SWT-04

Project

Project Definition	Phase Element Names	Phase Element Dates
Description	Estimator Information	Reviewer Information

Reviewer Information:

Name: Jack Forst

Title: Civil Engineer

Agency/Organization/Office: USACE

Business Address: 123 Army Corps Street

Telephone Number: (123) 234-4567

E-Mail Address: sjveaveqvdbj

Date Reviewed: 09/15/04

Clear Use Contact Info

Accept Save Close

2.3 RACER Level Three CTC Estimate Requirements

- ***The “Phase Name” – The phase name for this field must exactly be in accordance with the abbreviations shown in Table 1 above, depending on the phase being estimated. The phase name cannot be spelled out and the abbreviations must include the hyphenations and back slashes where applicable. If the template method is used these phase names will be populated for the user. If older versions of the estimates are used, check the phase names to ensure they are correct.***
- The “Media/Waste Type” field will include the primary waste being treated.
- The “Secondary Media/Waste Type” field will include the secondary waste being treated in the estimate, if applicable.
- The “Contaminant” field will include the primary contaminant being treated.
- The “Secondary Contaminant” field will include the secondary contaminate being treated, if applicable.
- The “Approach” field will include the approach used depending on the technologies being estimated (i.e., If the Excavation and Off-site T&D technologies are chosen, then the approach would be “ex-situ”).
- ***The “Phase Start Date” should be the anticipated start date for the phase being estimated. Upon initial entry to the phase level screen the date is defaulted from the level two screen inputs. As estimates are updated these dates may need to be modified. If the defaulted phase date is not correct it must be modified to reflect the start date of the phase being estimated. The date from the level 3 phase screen is used by the post processor to establish the start dates for the phase cost data that is uploaded to FUDSMIS.***
- The “Phase Markup” button is to select the appropriate FUDS Markup Template for the specific phase being estimated. The suggested markup templates will be loaded in the system when the correct preferences are imported (see Section 1.0 above). The FUDS Markup Templates are based on the basic RACER default markup template, and include allowances for Risk/Contingencies and Owner Costs as shown in Table 2. “Rate Groups” and “Technology Markup” fields on this screen will be left as defaulted in RACER.
- The “Description” field is a mandatory entry field and must be used to document various aspects of the phase being estimated. The user will be prompted by the system to update this field whenever making changes to this screen and/or technologies within the phase. The comment field should include:
 - Description of what is being estimated in a particular phase.
 - Rationale and References for technology and quantity selections/changes for the phase.
 - Any unique or special site specific considerations that have a significant effect on the CTC estimate.

FUDS Phase	Risk/Contingencies	Owner Cost
PA	5.00%	12.00%
SI	5.00%	12.00%
RI/FS	5.00%	12.00%
EE/CA	5.00%	12.00%
RD	15.00%	13.00%
RmD	15.00%	13.00%
RA-C	15.00%	13.00%
RmA-C	15.00%	13.00%
IRA	15.00%	13.00%
RA-O	15.00%	13.00%
LTM	5.00%	2.00%
PCO	0.00%	0.00%

Table 2. Risk/Contingency Allowances by Phase

- Level 3 screen shot example below:

The screenshot shows the RACER - PIRS Example Database1_700.mdb application window. The left pane displays a tree view with the following structure:

- RACER
 - LKL TEST
 - Nw/O
 - Atlas Missile Site
 - Atlas Missile Site 2
 - RA-C (selected)
 - PIRS Example Project
 - RCRA C Cover
 - SWT-04

The main window displays the "Phase Element Type - Remedial Action" form. The form includes the following fields and sections:

- Name:** RA-C
- Description:** This field should be populated with information about the specific phase being estimated.
- Media/Waste Type:** Soil
- Secondary Media/Waste:** N/A
- Contaminant:** Fuels
- Secondary Contaminant:** None
- Approach:** Ex Situ
- Phase Element Start:** April 2006
- Rate Groups:**
 - Labor: System Labor Rate
 - Analysis: System Analysis Rate
 - Buttons: Recalculate Estimates, Phase Element Markups, Technology Markups
- FUDS Property Costs: User-Defined**
 - Display: ☒ Direct Costs, ☐ Marked-up Costs
 - Buttons: Select Technology, Run Technology, Delete Technology, Wizard
- Table:**

#	Technology	Direct Costs
1	Excavation	
- Summary:**
 - Total Direct Capital Costs: \$
 - Total Direct O&M Costs: \$
 - Total Direct Costs: \$
- Buttons:** Save, Close

- The above remedial action phase screen shot shows the “Run O&M” button. In past versions of RACER, the O&M phase was created in the RA-C phase. A few years ago RACER created a way to make the RA-O phase (O&M) a standalone phase. This is now the preferred way to calculate RA-O and will be used for all new estimates. Existing estimates that contain the RA-O (O&M) phase calculated under the old method should be transitioned to the current method by creating a separate RA-O phase. Chances are, in the future, RACER will no longer support the old method of calculating RA-O (O&M). It is now time to start the transition for these older estimates and update them appropriately.

2.4 RACER Level 4 (Technology Level) CTC Estimate Requirements

- Each technology has required and may have secondary parameters. The parameters must be completed using the appropriate reference documents.
- Each RACER technology has a “Comments tab”. This field is intended to document how the required parameters were determined. Applicable data elements that will be captured in the comment field are:
 - Rationale for required parameter selections and secondary parameter modifications (i.e., if the excavation model is used, show in the comments, how you derived at the quantity to be excavated, etc).
 - Explain changes and/or additions to assembly items.
 - List any quotes used for pricing.
 - Statement about duration of any cost element that has cost over time (i.e., RA-O phase, and the Monitoring and Natural Attenuation technology models).
 - Any unique or special site specific considerations that have a significant effect on the technology being estimated.

3.0 PRP Project Estimate Preparation

PRP projects require a cost to complete estimate to be reported therefore an estimate with the appropriate phases as outlined in the FUDS ER must be developed. The costs associated with PRP projects may only represent district ‘level of effort’ costs associated with negotiation/litigation support. Also, included are amounts for which the ER-FUDS account is responsible under signed agreements. Therefore a PRP project may only include costs for PN and PCO phases. It may also include cost for study phases that are needed in negotiations. If an agreement is made, only PCO phase costs should be included.

The typical costs that are included in a PRP cost estimate are as follows.

- Costs for Project management, attorney, technical, contracting, etc. hours required for research, coordination etc. Provide a brief explanation of duties performed for the level of effort to support the man-hours.
- Cost for Limited Testing that may be required during negotiations.

4.0 NDAI Project Estimate Preparation

All NDAI projects that require regulatory concurrence and have not achieved this concurrence require a CTC estimate with a PCO phase only to allow the district to plan for and pay for the activities to achieve this concurrence. The activities that can be included in the PCO phase are limited sampling and coordination with regulators. If an NDAI project that require regulatory concurrence does not have a PCO phase estimate, an explanation of why the district is not planning for obtaining the concurrence using a PCO phase estimate must be included in FUDSMIS with the explanation of the NDAI. Examples of explanations of why a NDAI project does not have a PCO Phase;

- Regulators will not provide concurrence
- Project was combined with another project. Provide other project name and number

5.0 Estimates Developed With Other Tools

In some cases, EXCEL Spreadsheets, MCACES estimates, and contractor estimates, etc. are used to support CTC FUDSMIS entries. When these types of estimates are used, the documentation requirements are the same as in the above paragraphs and should be incorporated into the estimate. Ensure the property and project numbers are clearly documented in the estimate. Regardless of the type of estimate, it is critical that the FUDSMIS Cost to Complete data be traceable to the estimate and that estimate is traceable to the project.

6.0 Limitations on FUDS Phase Durations.

When developing CTC estimates for FUDS Projects, the maximum duration of any phase is to be limited to 30 years for planning purposes. The only exception would be projects where the Decision Document (DD) specified a remediation technology that would require the RA-O phase to extend beyond 30 years. In these cases, the CTC estimate would include the duration of the RA-O phase as identified in the DD. This exception to the 30-year maximum phase duration must be approved by HQUSACE (CEMP-DE) prior to signature of the DD.

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Appendix C
Quality Control Review Checklist.

The attached replica of the Quality Control Checklist is provided for information. Districts will complete the Quality Control Review and record the results of their review of CTC estimates for FUDS Projects using screens in FUDSMIS.

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**FUDS Project Cost-to-Complete Estimate
Quality Control Review Checklist
Questions and Answer Guide**

No.	Question	Possible Answers	How to Answer this Question
1	Does the current estimate <u>total</u> for the Budget year and beyond vary by more than 10 percent from the previous LCP entries for the same time period? (Compare your current estimate to the total shown above)	Yes/No	A table will be available at the top of the QC Review Screen in FUDSMIS that provides the phase amounts and the total amount for the estimate being reviewed. The table will also provide the total amount currently in the Project LCP for the same period addressed in the estimate. If the current estimate varies by more than 10%, either up or down, from the amount currently in the LCP, answer the question with a “YES” and provide reasons from the drop down lists provided. If the estimate is within 10% of the amount currently in the LCP in FUDSMIS, answer the question with a “NO” and do not select reasons from the drop down lists.
	<p>If the answer to Question 1 is “YES”, provide reasons from three drop-down lists:</p> <ul style="list-style-type: none">• Drop down list of <u>Technical Reasons</u> for change in the estimate:<ul style="list-style-type: none">○ Phase Completion○ Phase Added○ New Information on Contaminants○ New Information on Area or Volume of Contaminated Media○ Technical Approach• Drop down list of <u>Regulatory Reasons</u> for change in the estimate:<ul style="list-style-type: none">○ Revised Regulatory Requirements○ New Regulatory Requirements• Drop down list of <u>Estimating Reasons</u> for change in the estimate:<ul style="list-style-type: none">○ Database Update or Correction○ Omission of cost data <p>Provide comments:</p>		<p>If Question 1 is answered with a “YES”, the QC Reviewer can select reasons from three drop-down lists. At least one reason from one list must be selected, but the QC Reviewer may select a reason from all three lists, if appropriate. If Question 1 is answered with a “NO”, no reasons are to be provided. A “Comment” field is available for the QC Reviewer to provide comments on actions taken.</p>

No.	Question	Possible Answers	How to Answer this Question
2	Was the estimating method (i.e., parametric or detailed) appropriate for the type of project? (e.g., Was RACER used for projects without a Decision Document?)	Yes/No	If the type of estimating method is appropriate for the status of project, answer the question with a “YES”, otherwise answer the question with a “NO”.
3	Was the person or persons developing the estimate qualified by training and experience to use the estimating tool?	Yes/No	If the person that developed the estimate has been trained in the estimating tool and has the necessary experience, answer the question with a “YES”, otherwise answer the question with a “NO”.
4	Does the estimate include background information for the property and project?	Yes/No	If the estimate contains sufficient information to document the estimate as required by Appendix B, answer the question with a “YES”, otherwise answer the question with a “NO”.
5	Does the estimate include all the appropriate costs? (i.e., all appropriate phases and tasks included?)	Yes/No	If the estimate contains all appropriate costs, answer the question with a “YES”, otherwise answer the question with a “NO”. “All appropriate costs” means all required phases and all appropriate tasks to properly estimate the environmental liability of the project.
6	Does the estimate include the references that were used to determine phase, tasks, technologies, and quantities used to generate the estimate?	Yes/No	If the estimate contains the necessary references required to provide the basis for developing the estimate, answer the question with a “YES”, otherwise answer the question with a “NO”.

Appendix D
Supervisory Review Checklist.

The attached replica of the Supervisory Review Checklist is provided for information. Districts will complete the Supervisory Review and record the results of their review of CTC estimates for FUDS Projects using screens in FUDSMIS.

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**FUDS Project Cost-to-Complete Estimate
Supervisory Review Checklist
Questions and Answer Guide**

No.	Question	Possible Answers	How to Answer this Question
1	Does the project estimate reflect all future activities/tasks/phases and none of the past activities/tasks/phases?	Yes/No	To answer this questions with a “YES”, the estimate must contain only work planned for the BY and out in the LCP and must not include any work already accomplished in the current year or prior years. It these conditions are not met, answer the question with a “NO”.
2	Are the phase amounts in the estimate that is attached to FUDSMIS accurately reflected in the FUDSMIS LCP, which is shown above?	Yes/No	This question is to ensure that the amounts in the estimate have been entered accurately into FUDSMIS. To answer this question “YES”, the estimate and FUDSMIS must contain the same phases and the phase totals must be within \$100 (\$0.1 K in FUDSMIS). It these conditions are not met, answer the question with a “NO”.

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Appendix E
HTRW CX and MM CX Qualification Statements

The following are qualification statements for HTRW CX and MM CX personnel that should be appended to the District's Quality Control Plan if CX personnel are to be directly involved in the development or QC review of estimates for a specific District.

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**Qualification Statements
For
HTRW CX and MM CX
Quality Control Reviewers**

Kate M. Peterson
Qualifications for QC Review of FUDS CTC Estimates
18 January 2005

Position: HTRW Center of Expertise, Environmental Cost, Compliance and Technology Branch, Civil Engineer

Certifications:

- Professional Engineer, State of Nebraska
- Tri-Service Certified Cost Engineer

Education and Training:

- Bachelor of Science, Civil Engineering with a Construction Management Option, University of Wyoming, 1987
- Certified as Trained in RACER
- Certified as Trained in RACER Train the Trainer
- Certified as Trained in MCASCES
- FUDS CTC Training
- Network Analysis and Scheduling

Professional Experience:

1994-Present. HTRW-CX Environmental Cost, Compliance, and Technology Branch

- Responsible for assisting with the development of HTRW cost engineering policy / guidance.
- Member of the Tri Services Automated Cost Engineering Systems (TRACES) Unit Price Book Committee and the Remedial Action Cost Engineering Requirements (RACER) Technical Users Group and Steering Committee.
- Review District FUDS CTC estimates.
- Provide training to District employees on the FUDS CTC cost estimate preparation process.
- Provide RACER training to District employees.

1988-1994. Cost Engineering Branch, Omaha District

- Major responsibilities at the District included preparation of cost estimates from military, civil, and HTRW design packages.

Contact Information:

Mailing Address:

USACE - HTRW Center of Expertise Attn: Kate Peterson HX-T
12565 West Center Road
Omaha, NE 68144

Telephone: (402) 697-2612

E-mail: katherine.m.peterson@mrd01.usace.army.mil

Rick L. Osborn
Qualifications for QC Review of FUDS CTC Estimates
18 January 2005

Position: HTRW Center of Expertise, Environmental Cost, Compliance, and Technology Branch

Certifications: DoD Tri-Service Certified Cost Engineering Technician

Education and Training:

- Associate Degree in Arts and Sciences from Iowa Western Community College in 1978
- Certified as Trained in RACER
- Certified as Trained in RACER Train the Trainer
- Certified as Trained in MII

Professional Experience:

- 20 years experience in the cost engineering field. Development of various estimates for military construction, civil works, and HTRW projects for the Omaha District.
- Responsible for assisting Districts and Divisions with HTRW cost engineering policy/guidance issues, HTRW cost estimate review, and updating/maintaining cost engineering software and databases.
- Other duties include training the RACER estimating software and mentoring District cost engineers on the development of budgetary estimates used in the various Corps wide supported programs.
- Member of the RACER User Group which performs annual reviews, testing and updates of the software.

Contact Information

Mailing Address: U.S. Army Corps of Engineers
HTRW Center of Expertise
Attn: CENWO-HX-T (Rick Osborn)
12565 West Center Road
Omaha, NE 68144-3869

Telephone: 402-697-2426
FAX: 402-6972639

E-mail: rick.l.osborn@usace.army.mil

Steven M. Butler
Qualifications for QC Review of FUDS CTC Estimates
18 January 2005

Position: HTRW Center of Expertise, Environmental Cost, Compliance and Technology Branch, Civil Engineer

Certifications: Professional Engineer, State of Nebraska

Education and Training:

- Bachelor of Science, Civil Engineering, University of Nebraska, 1981
- Master of Science, Civil Engineering, University of Nebraska, 1993
- Certified as Trained in RACER
- Certified as Trained in RACER Train the Trainer
- Certified as Trained in MII

Professional Experience:

2003-Present. HTRW-CX – Environmental Cost, Compliance, and Technology Branch

- Review District FUDS CTC estimates.
- Provide training to District employees on the FUDS CTC cost estimate preparation process.
- Provide RACER training to District employees and AEC personnel.
- Assist in the development of the RACER cost estimating software.

1991-2003. HTRW-CX – Geoenvironmental and Process Engineering Branch

- Provide technical assistance to Corps of Engineers Districts on geotechnical issues.
- Write and review standard specifications and technical manuals.
- Develop and present geotechnical training courses.

1989-1991. Corps of Engineers, Omaha District, Geotechnical Branch

- Project engineer responsible for investigations and designs of remediation projects.

1984-1989. Corps of Engineers, Missouri River Division Laboratory, Soils Section

- Supervised the Soils Testing Section.

1981-1984. Corps of Engineers, Omaha District, Monitoring and Evaluation Branch

- Performed inspections on dams, levees, and bridges.

Contact Information:

Mailing Address:

USACE - HTRW Center of Expertise Attn: Steve Butler HX-T

12565 West Center Road

Omaha, NE 68144

Telephone: (402) 697-2656

E-mail: steve.m.butler@usace.army.mil

Lindsey Lien
Qualifications for QC Review of FUDS CTC Estimates
18 January 2005

Position: HTRW Center of Expertise, Geoenvironmental and Process Engineering Branch,
Environmental Engineer

Certifications: Professional Engineer, State of Nebraska

Education and Training:

- Bachelor of Science, Civil Engineering, South Dakota State University, 1978
- Master of Science, Civil/Environmental Engineering, University of Nebraska, 1985
- Certified as Trained in RACER

Professional Experience:

1988-Present. HTRW-CX – Geoenvironmental and Process Engineering Branch

- Provide technical assistance to Corps of Engineers Districts on environmental engineering issues.
- Write and review standard specifications and technical manuals.
- Develop and present environmental engineering training courses.
- Review District FUDS CTC estimates.
- Assist in the development of the RACER cost estimating software.

1978-1988. Corps of Engineers, Omaha District, Design Branch, Environmental Design Section

- Project Engineer responsible for treatment plant design and designs at environmental remediation projects.

Contact Information:

Geoenvironmental and Process Engineering Branch CENWO-HX-G

HTRW Center of Expertise

U.S. Army Corps of Engineers

Omaha, NE 68144-3869

(402) 697-2580 (v)

(402) 697-2595 (fax)

lindsey.k.lien@usace.army.mil

Terry Tomasek
Qualifications for QC Review of FUDS CTC Estimates
18 January 2005

Position: HTRW Center of Expertise, Environmental Health and Safety Branch, Industrial Hygienist

Education and Training:

- Bachelor of Science, Chemistry, University of Nebraska-Omaha, 1974
- Certified as Trained in RACER
- Certified as Trained in RACER Train the Trainer

Professional Experience:

1988-Present. HTRW-CX Environmental Health and Safety Branch

- Assist in the Review of FUDS CTC QC estimates.
- Provide technical assistance to Corps of Engineers Districts on Health and Safety issues.
- Technical expert on asbestos for the Corps of Engineers.

1985-1988. Veterans Administration

- Head of the Fire, Safety and Health Program at the V.A. Hospital in Omaha, NE.

1974-1985. Department of Labor

- Industrial Hygienist with the US Department of Labor - OSHA.

Contact Information:

Mailing Address:

USACE - HTRW Center of Expertise Attn: Terry Tomasek HX-H
12565 West Center Road
Omaha, NE 68144

Telephone: (402) 697-2590

E-mail: Terry.W.Tomasek.@usace.army.mil

Jason B. Adams

Qualifications for QC Review of FUDS CTC Estimates

18 January 2005

Position: Cost Engineering Team Leader for Military Munitions Center of Expertise, Cost Engineering Branch, USACE Engineering and Support Center, Huntsville

Certifications:

- Professional Engineer, State of Alabama

Education and Training:

- Bachelor of Science in Engineering, Industrial and Systems Option, University of Alabama in Huntsville, 1999
- Certified as Trained in Military Munitions Response Program
- Certified as Trained in Environmental Laws and Regulations
- Certified as Trained in FUDS Program Policy (ER 200-3-1)
- Certified as Trained in RACER Train the Trainer
- Certified as Trained in MCACES MII (Second Generation)
- FUDS CTC Training

Professional Experience:

Jan 2004-Present. Cost Engineering Team Leader for Military Munitions Center of Expertise, Cost Engineering Branch, USACE Engineering and Support Center, Huntsville

- Responsible for assisting with the development of MM cost engineering policy / guidance.
- Member of the RACER Technical Users Group and Steering Committee.
- Reviewed FUDS MMRP/CWM Estimates.
- Prepared FUDS MMRP Detailed Estimates.
- Assist Districts in the Development of FUDS MMRP CTC estimates.
- Provided training to District employees on the FUDS CTC cost estimate preparation.
- Provided RACER training to District employees.
- Assisted in the Development and Further Advancement of MMRP RACER Technologies

Jan 2000 – Jan 2004 Cost Engineer, Cost Engineering Branch, USACE Engineering and Support Center, Huntsville

- Majority of responsibilities are the same as present responsibilities.

Contact Information:

Mailing Address:

U.S. Army Corp of Engineers

4820 University Square

Attn: Jason B. Adams (CEHNC-ED-ES-C)

Huntsville, AL 35816-1822

(256) 895-1556 (Voice)

Jason.B.Adams@usace.army.mil

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Appendix F
USACE Center of Expertise Quality Assurance (QA) Plan for FUDS Cost-to-Complete Estimates, FY2006

This document describes the Quality Assurance procedures that will be followed by the HTRW CX and MM CX during the annual CTC estimate QA Review process for FUDS.

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USACE Center of Expertise Quality Assurance (QA) Plan

For the

Formerly Used Defense Sites (FUDS)
Cost-To-Complete (CTC) Estimates
FY2006

U.S. Army Corps of Engineers

HTRW Center of Expertise

November 2006

1 Introduction

USACE geographic Military Divisions are responsible for performing a Quality Assurance (QA) Review of the Cost-to-Complete (CTC) estimate development process for their assigned Districts. Within the Division, the Division Formerly Used Defense Sites (FUDS) Program Managers (PgM) will lead this effort, often assisted by the USACE Centers of Expertise. In addition, ER 200-3-1 requires the USACE Hazardous, Toxic, and Radioactive Waste (HTRW) and Military Munitions (MM) Centers of Expertise (CXs) perform a Quality Assurance Review. This document describes the QA procedures that will be followed by the CXs during the annual CTC estimate QA Review process for FUDS.

2 Purpose

The QA review is a component of the quality review process performed on all projects which require a FUDS CTC estimate. The following is a summary list of the checks made during the QA review process:

- Compare FUDSMIS cost data entry with final CTC estimate
- Ensure archiving of permanent files to FUDSMIS was completed
- Review estimate development
- Prepare a QA Summary Report

The QA review helps to ensure that the FUDS CTC estimate development process will successfully pass an audit of the accounting practices used to develop the FUDS Environmental Liability Report.

3 QA Project Delivery Team

3.1 QA Team Leader

Ms. Kate Peterson (CENWO-HX-T, 402-697-2610) is the CX Team Leader for this effort. The Team Leader establishes quality criteria that must be met by the QA Review Team.

3.2 QA Reviewers

The following individuals will perform QA Reviews for the CTC effort:

- Kate Peterson, CENWO-HX-E, (402) 697-2610
- Steve Butler, CENWO-HX-E, (402) 697-2656
- Rick Osborn, CENWO-HX-E, (402) 697-2426
- Terry Tomasek, CENWO-HX-E, (402) 697-2590
- Lindsey Lien, CENWO-HX-E, (402) 697-2580
- Rich Stricker, CENWO-HX-E, (402) 697-2575
- Jason Adams, CEHNC-ED-ES-C, (256) 895-1556

The QA review team will be identified in FUDSMIS. Only those individuals identified as QA reviewers will be allowed to perform QA reviews. All QA reviewers must participate in the annual “Environmental Liability and CTC Process Training” to be eligible to perform QA reviews.

4 Recording QA Reviews

All QA review results are recorded in FUDSMIS. A project is eligible for QA review after the Quality Control and Supervisory Reviews have been completed. The QA review is not considered “Complete” until all questions on the QA form have been answered “Yes” or “NA.” If any question is answered “No,” the QA review is designated as “Underway.” Unlike the Supervisory Review, answering a QA review question “No” does not wipe out the results of the QC or Supervisory Reviews.

5 Archiving of Permanent Files to FUDSMIS

The QA reviewer will retrieve all CTC project information from either FUDSMIS (CX and District Assigned Projects) or the PIRS web site (Indexed Projects). In doing so, this will determine if the District followed the archiving procedures spelled out in the CTC handbook.

6 FUDSMIS Cost Data Entry

All projects (CX assigned, District assigned, and Indexed Projects) will be reviewed to ensure the FUDSMIS current working data CTC entries match the CTC data archived on FUDSMIS. The QA reviewer will access FUDSMIS and check phase costs and project totals against the cost reports archived on FUDSMIS. For those projects that were indexed in FY07, the estimate supporting the entries in FUDSMIS is archived on PIRS. The actual total shown in FUDSMIS for indexed projects will be different as a result of an applied index factor. Review of these projects will ensure that the index factor was applied correctly to the phase and project totals when compared to the previous years estimate.

7 Review of Estimate Development

7.1 Project Selection for QA Review of Estimate Development

A representative sample of Approved¹ projects will be queried from FUDSMIS to create the list of projects for the QA Review of “Estimate Development.” The goal will be to include at least 10% of a particular District’s approved projects. To select 10% of the projects from FUDSMIS, every tenth project on this list will be chosen. If this process does not yield a minimum of 10 project estimates for a particular District, the interval will be reduced to every ninth, eighth, etc. in order to identify at least 10 projects. For those district’s that may have 10 or less projects in their project data set, all projects will be selected. Also, all projects with CTC amounts greater than or equal to \$50,000,000 will be included in the list.

¹ “Approved” refers to the FUDSMIS data element that indicates the Division has approved the FUDS Project

The projects in the QA list will be reviewed for “Estimate Development” based on questions 3 through 7 of the QA checklist. The QA checklist is shown and explained later in this document. The QA Team Leader will assign review responsibilities for each project to QA team members. Caution will be exercised to prevent the QA Review from being conducted by a person who has either assisted in the development of a project estimate or has performed a QC Review on a project estimate.

7.2 Estimate Development

The review of estimates will focus on the technical quality to ensure the estimates meet accounting standards that require traceability and replicability of the costs included in the FUDS Environmental Liability Report (ELR). The QA Review will retrieve project estimate data from FUDSMIS (CX and District Assigned Projects) or PIRS (Indexed Projects). For those projects that were ‘indexed’, the QA reviewer will go back to the previous years estimate submittal, and ensure it meets the current estimating standards. The QA checklist questions will be answered for each project estimate reviewed to determine the adequacy of the estimate development.

8 Division Override

The Division FUDS Program Managers (PgM) is the lead for the QA review effort for each project within their Division. The PgM can override the CX QA results for any project in their Division. This override must be documented in FUDSMIS on the QA review form. If the QA review for a project is overwritten, the project will be eligible for upward reporting in the ELR.

9 QA Summary Report

The HTRW-CX will provide a narrative analysis of the QA review for each District to the respective Division FUDS Program Manager. The report will provide an assessment of the major components of the district CTC process with analysis on the total number of projects, project dollar totals, and number of projects that either met or did not meet the CTC requirements. The HTRW-CX will also provide an assessment to HQUSACE of the overall CTC estimating process at a national level, with an information copy to the Divisions.

FUDS Cost-to-Complete Quality Assurance Review Checklist		
#	Question	Rationale to answer the question
1.	Does the estimate/documentation match the phase and total costs shown in FUDSMIS for the project?	To ensure that the costs reported for the FUDS ELR from FUDSMIS are supported by the project estimates stored on FUDSMIS and PIRS. For those projects that are ‘Indexed,’ the previous estimate shown on PIRS should be less the indexing factor.

FUDS Cost-to-Complete Quality Assurance Review Checklist		
#	Question	Rationale to answer the question
2.	Has the estimate supporting the LCP phase entries been attached to FUDSMIS/PIRS?	To ensure the estimate and supporting project documentation has been prepared and is correctly archived to FUDSMIS (CX and District Assigned Projects) or PIRS (Index Assigned Projects).
3.	Was the estimating method (i.e., parametric, detailed, spreadsheet) appropriate for the stage of project? (e.g., Was RACER used for projects without a Decision Document?)	To determine if the appropriate estimating tool was used to prepare the estimate. RACER is required to be used when a decision document is not completed. Once a decision document is completed, use of RACER is optional and detailed estimating tools such as MCACES can be considered for use.
4.	Was the person or persons developing the estimate qualified by training and experience to use the estimating tool?	To determine if personnel qualified by experience and training are developing and reviewing the FUDS CTC estimates. Qualified personnel include persons who have attended FUDS CTC in the past year and have attended RACER training in the past.
5.	Does the estimate include background information for the property and project?	To ensure each project estimate contains appropriate background information. Background information should include documentation on the following: <ul style="list-style-type: none"> • The FUDS property and project; • Names of estimator, • Members of the Support Team; • Reasons for change from the last reported estimate; and • Any unique or special site conditions.
6.	Does the estimate include all the appropriate documentation and costs, i.e. all appropriate phases and tasks with overhead, profit, and government oversight?	To ensure that the project estimate includes all FUDS ELR costs associated with completion of the project. Documentation must be provided on how estimate input parameters were determined. This may include: <ul style="list-style-type: none"> • The rationale for technology and quantity selections; and • The rationale for required parameter selections and secondary parameter modifications.
7.	Does the estimate include the references that were used to determine phase, tasks, technologies and quantities used to generate the estimate?	To ensure each estimate documents all references used to prepare the estimate.

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Appendix G
Environmental Liabilities Required To Be Reported on Annual Financial
Statements (Report Number D-2004-080), Inspector General, Department of
Defense, 5 May 2004.

The following is the first twelve pages of the DoDIG report that identified deficiencies in the management of the Army's cost-to-complete process.

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May 5, 2004



Financial Management

Environmental Liabilities Required To Be Reported on Annual Financial Statements (D-2004-080)

Department of Defense
Office of the Inspector General

Constitution of
the United States

A Regular Statement of Account of the Receipts and Expenditures of all public Money shall be published from time to time.

Article I, Section 9

Additional Copies

To obtain additional copies of this report, visit the Web site of the Inspector General of the Department of Defense at www.dodig.mil/audit/reports or contact the Secondary Reports Distribution Unit of the Audit Followup and Technical Support Directorate at (703) 604-8937 (DSN 664-8937) or fax (703) 604-8932.

Suggestions for Future Audits

To suggest ideas for or to request future audits, contact the Audit Followup and Technical Support Directorate at (703) 604-8940 (DSN 664-8940) or fax (703) 604-8932. Ideas and requests can also be mailed to:

OAIG-AUD (ATTN: AFTS Audit Suggestions)
Inspector General of the Department of Defense
400 Army Navy Drive (Room 801)
Arlington, VA 22202-4704

Defense Hotline

To report fraud, waste, or abuse, contact the Defense Hotline by calling (800) 424-9098; by sending an electronic message to Hotline@dodig.osd.mil; or by writing to the Defense Hotline, The Pentagon, Washington, DC 20301-1900. The identity of each writer and caller is fully protected.

AEC	Army Environmental Center
BRAC	Base Realignment and Closure
CTCNORM	Cost-to-Complete Normalization of Data System
DERP	Defense Environmental Restoration Program
DSERTS	Defense Site Environmental Restoration Tracking System
EPR	Environmental Program Requirements
FMR	Financial Management Regulation
FUDS	Formally Used Defense Sites
FUDSMIS	Formally Used Defense Sites Management Information System
HTRW	Hazardous Toxic Radioactive Waste
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
OEW	Ordnance and Explosive Waste
RACER	Remedial Action Cost Engineering Requirements
RCTCS	Restoration Cost-to-Complete System
VV&A	Verification, Validation, and Accreditation



INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-4704

May 5, 2004

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE (COMPTROLLER)/CHIEF
FINANCIAL OFFICER
ASSISTANT SECRETARY OF THE AIR FORCE (FINANCIAL
MANAGEMENT AND COMPTROLLER)
DIRECTOR, DEFENSE FINANCE AND ACCOUNTING SERVICE
NAVAL INSPECTOR GENERAL
AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Report on Environmental Liabilities Required To Be Reported on Annual Financial
Statements (Report No. D-2004-080)

We are providing this report for review and comment. We received comments on a draft of this report from the Under Secretary of Defense (Comptroller)/Chief Financial Officer, the Deputy Under Secretary of Defense (Installations and Environment) and the Military Departments. We considered the management comments when preparing the final report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. The Army comments were partially responsive. We request additional Army comments on Recommendation A.2.a. As a result of management comments, we added Recommendation A.3. directed to the Secretary of the Army. Therefore, we request that the Army provide comments on Recommendations A.2.a. and A.3. by July 6, 2004.

If possible, please send management comments in electronic format (Adobe Acrobat file only) to Audcm@dodig.osd.mil. Copies of the management comments must contain the actual signature of the authorizing official. We cannot accept the / Signed / symbol in place of the actual signature. If you arrange to send classified comments electronically, they must be sent over the SECRET Internet Protocol Router Network (SIPRNET).

We appreciate the courtesies extended to the staff. Questions should be directed to Mr. Benjamin A. Mehlman at (703) 604-9291 (DSN 664-9291) or Ms. Rhonda L. Ragsdale at (703) 604-9347 (DSN 664-9347). The team members are listed inside the back cover. See Appendix H for the report distribution.

By direction of the Deputy Inspector General for Auditing:

David K. Steensma

David K. Steensma
Assistant Inspector General
for Contract Management

Office of the Inspector General of the Department of Defense

Report No. D-2004-080

(Project No. D2003CB-0037)

May 5, 2004

Environmental Liabilities Required To Be Reported on Annual Financial Statements

Executive Summary

Who Should Read This Report and Why? DoD civilians and uniformed officers responsible for environmental cost estimating and financial reporting should read this report. It discusses the management controls that are necessary to support financial reporting of environmental liabilities on financial statements.

Background. According to Public Law 101-576, "Chief Financial Officers Act of 1990," November 15, 1990, each executive agency shall prepare and submit to the Director of the Office of Management and Budget a financial statement for the preceding fiscal year. The Chief Financial Officers Act requires that financial statements prepared by an agency be audited by the Inspector General in accordance with applicable generally accepted government auditing standards and also requires the Inspector General to submit a report to the head of the audited agency. Environmental liabilities and disposal liabilities are reported on "Environmental Liabilities and Environmental Disposal Liabilities," Note 14 of the DoD-wide and individual Service-wide balance sheets. Contingent liabilities are reported as part of "Commitments and Contingencies," Note 16. As of September 30, 2002, DoD reported \$59.35 billion in environmental liabilities on Note 14 and \$12.7 billion of environmental related contingent liabilities on Note 16. Environmental liabilities include estimated amounts for future cleanup of contamination resulting from waste disposal methods, leaks, spills, and other past activity that have created a public health or environmental risk. DoD declared, in FYs 2002 and 2003, environmental liabilities as a systemic management control weakness as defined by the Federal Managers' Financial Integrity Act.

This report discusses the reliability of the data and processes used to report environmental liabilities including identifying and assessing the adequacy of the management controls relating to the reporting. The report focuses on selected Note 14 and Note 16 items where Military Departments made assertions on the fair presentation of the amounts reported or where the Under Secretary of Defense (Comptroller)/Chief Financial Officer requested we review an issue. We reviewed controls over \$21.92 billion of Army environmental liabilities and \$10.05 billion of Navy environmental liabilities as reported on Note 14 through a sampling of 735 environmental liability cost estimates at 28 Army activities and 1 Navy activity. We also reviewed \$3.67 billion of Note 16 contingent liabilities attributed as Army and Defense Logistics Agency environmental liabilities. We performed a detailed internal control review of the Army environmental liability estimates and the Navy nuclear-powered ship estimates, but did not perform substantive tests of the reported values of those estimates.

Results. The reliability of the data and processes used to report Army, Navy, and Defense Logistics Agency environmental liabilities needed improvement. The data and

processes used to report \$21.92 billion in environmental liabilities on Note 14 to the FY 2002 Army financial statements did not have adequate documentation and audit trails. As a result, Army Defense Environmental Restoration Program, Base Realignment and Closure (BRAC), and non-Defense Environmental Restoration Program environmental liability estimates were potentially misstated for the FY 2002 DoD-wide and Army-wide financial statements (finding A). The Army initiated action to improve controls by implementing a new feeder system to reduce the possibility of errors.

Although technically complying with existing modeling and simulation requirements, Air Force and Navy verification, validation, and accreditation reviews of environmental liability electronic cost estimating systems were performed without comparison of the estimates to actual costs (finding B). In response to the audit, the Navy and Air Force initiated action to document comparison of system-generated costs with associated actual project costs on present and future models.

Although the estimating methodology for the disposal of nuclear-powered ships appeared reasonable, the controls over a \$10.05 billion Navy Note 14 environmental liability estimate for the disposal of nuclear-powered ships needed improvement (finding C). The Office of the Deputy Under Secretary of Defense (Installations and Environment) is developing additional financial reporting policy for environmental compliance, nuclear-powered ship disposal, and chemical demilitarization for issuance in FY 2004. The Naval Sea Systems Command is also developing nuclear-powered ship disposal estimate reporting and control guidance. The Defense Finance and Accounting Service corrected previously reported errors by re-categorizing a \$2.6 billion Defense Logistics Agency environmental liability as a contingent claim and litigation from civil law on second quarter FY 2003 and subsequent DoD-wide financial statement Note 16. The contingent liabilities were related to the potential claims from Defense Logistics Agency fuel contracts and not to environmental liabilities (finding D).

Management Comments and Audit Response. The Deputy Under Secretary of Defense (Installations and Environment) agreed to implement guidance to improve the development, recording, and reporting of environmental liabilities. The Army Deputy Assistant Secretary of the Army (Environment, Safety, and Occupational Health) agreed that the Commander, U.S. Army Corps of Engineers, should establish a quality control program to assess environmental liability processes and controls, but did not agree that the Army BRAC Office should establish procedures to verify that Army BRAC environmental liability estimates are accurate and meaningful as required by financial management regulation and not adjusted because of potential budgetary constraints. Based on comments from the Under Secretary of Defense (Comptroller)/Chief Financial Officer we added a recommendation to the Army relating to review of the Army BRAC program environmental liability estimate (see finding A for detailed discussion of these recommendations). We request comments from the Army by July 6, 2004. The Assistant Secretary of the Navy (Financial Management and Comptroller) and the Deputy Chief of Staff of the Air Force (Installations and Logistics) agreed that the Naval Facilities Engineering Command and the Air Force Civil Engineering Support Agency issue guidance requiring that future environmental liability electronic cost estimating system efforts comply with Defense Environmental Restoration Program Management Guidance (see finding B for detailed discussion of these recommendations).

Table of Contents

Executive Summary	i
Background	1
Objectives	4
Findings	
A. Army Environmental Liabilities	5
B. Environmental Liability Electronic Cost Estimating Systems	16
C. Navy Nuclear-Powered Ship Disposal Environmental Liabilities	25
D. Defense Logistics Agency Contingent Environmental Liabilities	29
Appendixes	
A. Scope and Methodology	31
Management Control Program Review	34
B. Prior Coverage	36
C. Army DERP Active Installation Environmental Liabilities	38
D. Army DERP-FUDS Environmental Liabilities	43
E. Army BRAC Environmental Liabilities	50
F. Army non-DERP Environmental Liabilities	57
G. Management Comments on Findings A and B and Audit Response	61
H. Report Distribution	67
Management Comments	
Under Secretary of Defense (Comptroller)/Chief Financial Officer	69
Deputy Under Secretary of Defense (Installations and Environment)	70
Department of the Army	72
Department of the Navy	86
Department of the Air Force	92

Background

Reporting Requirement. According to Public Law 101-576, “Chief Financial Officers Act of 1990,” November 15, 1990, each executive agency must prepare and submit to the Director of the Office of Management and Budget a financial statement for the preceding fiscal year. The Chief Financial Officers Act of 1990 requires that financial statements prepared by an agency be audited by the Inspector General in accordance with applicable generally accepted government auditing standards and the Inspector General must submit a report to the head of the audited agency. Environmental liabilities include estimated amounts for future cleanup of contamination resulting from waste disposal methods, leaks, spills, and other past activity that have created a public health or environmental risk. This report discusses the reliability of the data and processes used to report environmental liabilities in the DoD Agency-wide financial statements. DoD identified, in performance and accountability reports for FYs 2002 and 2003, environmental liabilities as a systemic management control weakness as defined by the Federal Managers’ Financial Integrity Act.

Financial Management Regulation. DoD Regulation 7000.14-R, “DoD Financial Management Regulation (FMR),” volume 4, chapter 13, prescribes accounting policy and principles for measuring and recognizing DoD liabilities associated with the disposition of property, structures, equipment, munitions, and weapons. The FMR volume 4, chapter 13, also prescribes policy for measuring and recognizing the environmental liabilities associated with corrective actions and the future closure of facilities on active installations and for the environmental response actions at operational test and training ranges on active installations. FMR volume 4, chapter 14, prescribes the accounting policy and principles for measuring and recognizing DoD liabilities associated with the containment, treatment, or removal of contamination that could pose a threat to public health and the environment. The FMR volume 4, chapter 14, also prescribes the accounting policy for accrued environmental restoration costs for general property, plant, equipment, and stewardship land. Furthermore, it provides policy for accrued environmental restoration costs for potentially responsible party sites. FMR chapters 13 and 14 also identify that cost estimates of environmental disposal or environmental restoration activities are subject to audit.

Defense Environmental Restoration Program. Defense Environmental Restoration Program (DERP) Management Guidance, September 2001, provides program implementation information for environmental restoration at active installations, facilities subject to Base Realignment and Closure (BRAC), Formerly Used Defense Sites (FUDS), and cost-to-complete estimates and financial reporting of environmental restoration liabilities. In addition to the DERP guidance, the DERP-FUDS Program Manual, September 1999, provides general policy guidance on the execution of the FUDS program. In January 2002, the Army Environmental Center (AEC) issued additional environmental estimate cost-to-complete programmatic guidance covering DERP active installations and BRAC facilities.

Army non-DERP Guidance. Federal, State, and local environmental laws and regulations are the basis for non-DERP environmental project requirements.

Estimates for non-DERP environmental projects are entered into the Environmental Program Requirements (EPR) database. Guidance for developing and entering projects into the EPR database include: "Policy and Guidance for Identifying U.S. Army Environmental Program Requirements," February 2002; U.S. Army Environmental Program Requirements Catalog 2002, "A Catalog of Sample EPR Project Submissions and Program Guidance," August 2002; and the Environmental Program Requirements Quality Assurance Handbook, November 1998.

Note 14 and Note 16 of Financial Statements. DoD reports environmental liabilities and contingent liabilities on the DoD-wide and individual Service-wide balance sheets. Balance Sheet Note 14, "Environmental Liabilities and Disposal Liabilities," details the cost estimate elements that comprise environmental liabilities. Balance Sheet Note 16, "Commitments and Contingencies," details the cost elements that comprise contingent liabilities including environmental contingent liabilities. As of September 30, 2002, DoD reported \$59.35 billion for environmental liabilities and \$12.7 billion for environmental contingent liabilities. Table 1 outlines the DoD Component breakdown of the environmental liabilities reported on Note 14 and the environmental contingent liabilities reported on Note 16.

Table 1. FY 2002 Environment Liabilities on the DoD-Wide Balance Sheet		
<u>DoD Components</u>	<u>FY02 Environmental Liabilities in billions</u>	
	<u>Note 14</u>	<u>Note 16</u>
Army	\$35.08	\$10.10
Navy	15.47	0.00
Air Force	8.45	0.00
Other Defense Organizations	<u>0.35</u>	<u>2.60</u>
Total	\$59.35	\$12.70

We reviewed controls over \$21.92 billion of the \$35.08 billion of Army environmental liabilities and \$10.05 billion of the \$15.47 billion of Navy environmental liabilities reported on Note 14 through a sampling of 735 environmental liability cost estimates at 28 Army activities and 1 Navy activity. We also reviewed \$3.67 billion of Note 16 contingent liabilities attributed as Army and Defense Logistics Agency environmental liabilities (see Appendix A).

Army and Navy Management Assertions. On January 6, 2003, and June 26, 2003, through management representation letters, the Army asserted that all of the Army environmental liabilities were reported and presented fairly on the FY 2002 financial statements. Also, on August 9, 2002, and January 6, 2003, through management representation letters, the Navy asserted that it maintained a sound methodology for estimating environmental liabilities associated with nuclear-powered ships and submarines, and that the Naval Facilities Engineering Command (NAVFAC) had completed verification, validation, and accreditation (VV&A) of the cost-to-complete system for DERP environmental liabilities.

Auditing Standards for Accounting Estimates. The Codification of Statements on Auditing Standards Section 342 (AU 342), “Auditing Accounting Estimates,” provides guidance for auditing accounting estimates. Auditors must review and test management processes to assess the reasonableness of the accounting estimate. A strong internal control system will help ensure the reasonableness of an accounting estimate. AU 342 identifies the relevant aspects of an internal control system including the:

- accumulation of relevant, sufficient, and reliable data upon which to base estimates;
- preparation of the estimate by qualified personnel;
- adequate review and approval of estimates by appropriate levels of authority; and
- comparison of prior accounting estimates with subsequent results to assess the reliability of the process used to develop estimates.

Electronic Environmental Cost Estimating Software. Both FMR and DERP guidance require the use of electronic cost estimating software in most environmental liability estimating situations. DoD uses two such estimating software programs: the Remedial Action Cost Engineering Requirements (RACER) system is used by the Army and the Air Force, and the Cost-to-Complete component of the Normalization of Data System (CTCNORM) is used by the Navy.

RACER. The Air Force and Army use RACER for developing parts of out-year environmental liabilities estimates and annual budgets. Other DoD and Federal agencies also use RACER to prepare individual cost project estimates and to evaluate cost reasonableness of estimates. The Air Force Civil Engineering Support Agency developed and maintains the RACER system. Air Force Civil Engineering Support Agency planned and funded modifications, oversaw preparation of the simulation for use, and configuration management and maintenance of RACER. Air Force Civil Engineering Support Agency initiated a VV&A review of the RACER in January 2001. The process was completed in June 2001. Air Force Civil Engineering Support Agency was the verification and validation agent and the accreditation authority.

CTCNORM. NAVFAC developed and maintains the CTCNORM system. NAVFAC also initiated a VV&A review of the CTCNORM in March 2001. The process was completed in October 2001. NAVFAC was the verification and validation agent and the accreditation authority. NAVFAC reports Navy and Marine Corps environmental liability information derived from CTCNORM to the Office of the Assistant Secretary of the Navy (Financial Management and Comptroller).

Objectives

Our overall objective was to determine the reliability of the processes and data used to report environmental liabilities on financial statements. We also reviewed internal controls and compliance with laws and regulations related to the environmental liabilities. See Appendix A for a discussion of the scope and methodology and our review of the management control program. See Appendix B for prior coverage related to the objectives.

A. Army Environmental Liabilities

The data and processes used to report \$21.92 billion in DERP¹, BRAC, and non-DERP environmental liabilities on the FY 2002 financial statements did not have adequate documentation and audit trails. Although estimators were properly qualified to perform estimates, the Army did not document supervisory reviews of estimates and adequate quality control programs were not in place to ensure the reliability of data. This occurred because DERP, non-DERP, and BRAC activities were not following guidance concerning environmental liability financial reporting. In addition, non-DERP activities lacked specific implementation guidance, and DERP and BRAC activities lacked effective and reliable controls over feeder systems. As a result, DERP, BRAC, and non-DERP environmental liability estimates were potentially misstated for the FY 2002 DoD-wide and Army-wide financial statements.

Reporting Organizations

Personnel at active installations, BRAC installations, and U.S. Army Corps of Engineers (Corps of Engineers) districts (for FUDS properties) developed and reviewed the cost-to-complete environmental liability estimates (estimates) relating to future cleanup of contamination resulting from waste disposal methods, leaks, spills, and other past activity that have created public health and environmental risks. AEC was responsible for collecting, reviewing, and forwarding the estimates relating to DERP active installations, BRAC, and non-DERP to the Army Assistant Chief of Staff for Installation Management. The Corps of Engineers was responsible for collecting, reviewing, and forwarding the estimates relating to FUDS to the Assistant Chief of Staff for Installation Management. The Assistant Chief of Staff for Installation Management was responsible for validating and including the estimates in reporting environmental liabilities on the financial statements. (Additional details of Army reporting organizations are discussed in Appendixes C, D, E, and F.)

Army Controls Effectiveness

The Army did not maintain adequate documentation and audit trails to support environmental liability estimates for FY 2002. In addition, the Army did not document supervisory reviews of estimates and adequate quality control programs were not in place to ensure the reliability of data.

Documentation and Audit Trails. The FMR emphasizes that audit trails for environmental liabilities must allow transactions to be traced from the point of initiation to the final report. The audit trail must adequately support all transactions with relevant documents and source records, including a narrative providing sufficient explanation for the basis of the estimate, the date prepared,

¹ DERP locations included active installations and FUDS.

and the preparer name. The FMR also requires documentation must exist at the time of audit.

Documentation and audit trails permit tracing transactions through a system. Audit trails allow auditors or evaluators to ensure transactions are properly accumulated and correctly classified, coded, and recorded in all affected accounts. Audit trails are also necessary to enable supervisors, other estimators, and auditors to understand the methodologies used to develop estimates and determine whether estimates are reasonable and complete. We considered relevant, sufficient, and reliable environmental liability documentation to be pertinent project-related documents that supported underlining factors, assumptions, and estimated costs, including background information, disposal or restoration strategy, physical units in the estimate, cost per unit, cost adjustments such as conversion to current year dollars, and significant project changes.

Army Environmental Liability Documentation. The Army did not have adequate audit trails to ensure that documentation was readily available to support the underlying assumptions of estimates. Therefore, the Army did not meet the definition of an audit trail as defined in the DoD FMR. The majority of the Army documentation maintained at the installation level was not sufficient to support estimates throughout the reporting process. Table 2 shows that 634 of the 719 Army estimates reviewed did not have adequate documentation to lead auditors through the entire audit trail.

Table 2. Adequacy of Environmental Liability Estimates Documentation and Audit Trails

	<u>DERP</u>	<u>non-DERP</u>	<u>FUDS</u>	<u>BRAC</u>	<u>Totals</u>
Estimates Reviewed	231	45	300	143	719
Estimates without Adequate Audit Trails and Documentation	184	43	299	108	634

For DERP active installations, 47 of 231 estimates reviewed had an adequate audit trail that would allow the auditor to trace from the point of initiation to the final report (see Audit Trails and Documentation in Appendix C). DERP-FUDS activities provided adequate documentation for 1 of 300 estimates and non-DERP activities provided documentation for 2 of the 45 estimates reviewed. BRAC installations maintained adequate documentation for 35 of the 143 estimates.

For example, Headquarters, Corps of Engineers personnel were unable to provide supporting documentation for \$1.1 billion in management and support costs included in the FUDS related environmental liability reported on the financial statements (see Audit Trails and Documentation in Appendix D). In another example, Rocky Mountain Arsenal reported 72 estimates valued at \$745 million, the largest single DERP active installation location. Rocky Mountain used 31 program management estimates derived from a 1995 feasibility study to create

the 72 reported estimates. The Arsenal did not maintain records to support transfer and apportionment of data from the 31 program management estimates to the 72 reported estimates. As a result, we could not confirm assumptions, cost elements, and adjustments that comprised the estimates. Rocky Mountain Arsenal and AEC personnel stated that they were taking steps to revise FY 2003 reporting of the 31 program management based estimates to AEC in place of the 72 RCTCS/DSERTS estimates to allow for an audit trail for the estimates.

Supervisory Reviews. DERP active installation, FUDS, and BRAC activities did not routinely document supervisory reviews of environmental liability estimates when reporting environmental liabilities for the FY 2002 financial statements. The FMR requires organizations that prepare cost estimates to retain adequate documentation of management reviews. Table 3 shows that of 719 estimates reviewed at Army activities, only 74 estimates had adequate documentation of supervisory reviews of environmental liability estimates.

Table 3. Adequacy of Environmental Liability Estimate Supervisory Reviews					
	<u>DERP</u>	<u>non-DERP</u>	<u>FUDS</u>	<u>BRAC</u>	<u>Totals</u>
Estimates Reviewed	231	45	300	143	719
Estimates with Documented Supervisory Reviews	0	43	0	31	74

DERP Active Installations Supervisory Reviews. For DERP active installations none of 231 estimates reviewed showed evidence that management performed and documented adequate supervisory reviews of the estimates. Evidence existed that supervisors reviewed some estimates; however, there was no documentation that showed specifically what the supervisor reviewed. Adequate supervisory reviews would include verifying estimator-prepared estimates in accordance with financial reporting requirements and the DERP guidance. DERP guidance section 15.8.2 states that management must retain documentation of management review. DERP active installation supervisors stated that reviews mostly focused on reasonableness of estimates and not whether adequate supporting documentation or an audit trails existed. For example, the installation action plan for Aberdeen Proving Grounds showed a supervisory approval of 252 cost to complete estimates by installation management and headquarters level management. Installation level management stated that supervisory review did not include verification of critical items such as documentation and audit trail.

DERP-FUDS Supervisory Reviews. The Corps of Engineer districts and the U.S. Army Corps of Engineers Omaha Center of Expertise (Omaha Center) performed limited supervisory reviews of estimates. The districts reviewed estimates to ensure that cost allocation met proposed fiscal year funding. The Omaha Center verified that Formerly Used Defense Sites Management Information System (FUDSMIS) data were correctly entered and that estimators

included all project phases. However, FUDS guidance requires the development and use of a uniform checklist for supervisory reviews to ensure that estimators include all appropriate phases in the estimate. Neither the districts nor the Omaha Center documented supervisory reviews through the use of a uniform checklist in accordance with FUDS guidance.

BRAC Supervisory Reviews. Four of six BRAC installations did not provide evidence of supervisory reviews of estimates. According to personnel at the installations, the submittal of the estimates to higher-level management was considered as a form of supervisory review.

Army Quality Control Programs. The Army did not implement adequate quality control programs to ensure the reliability and accuracy of environmental liability estimates. An effective quality control program should include procedures for continual monitoring whether the policies and procedures related to the standards are suitably designed and are effectively applied. Effective quality control programs are necessary to aid personnel in identifying errors in estimates prior to reporting. For example, maintaining supporting documentation can help ensure that estimators have included costs for all phases of projects or have used the most recent historical data when developing estimates. In addition, by implementing supervisory reviews (another element of an effective quality control program), supervisors may be able to identify errors prior to approving and reporting estimates. The critical elements of a quality control program include documentation and audit trails, supervisory reviews, and quality assurance reviews. Army activities did not implement sufficient internal quality control programs to ensure they reported complete and correct data.

DERP Active Installations and BRAC Quality Assurance. Quality assurance reviews conducted by AEC on DERP active installations and BRAC estimates were not sufficient to ensure that the accounting standards outlined in the FMR were met. AEC performed quality assurance reviews on FY 2001 estimates at 41 DERP active installations and BRAC installations. AEC reviews showed that of the 41 installations, 16 did not use RACER software, 37 did not have adequate documentation, 19 did not reflect the environmental restoration strategy, 8 lacked environmental liability estimation training, and 7 lacked evidence of supervisory reviews. Although the AEC quality assurance review identified the above deficiencies, AEC did not finalize the results of the review until late fall 2002. As a result, there was little or no effect for the FY 2002 financial statements on the adequacy of supporting documentation, audit trails and documentation of supervisory reviews.

Inconsistencies also existed between the deficiencies in the AEC quality assurance reviews of DERP active installations and BRAC locations and our review regarding adequacy of documentation and audit trails. For example, AEC began a quality assurance review of Rocky Mountain Arsenal but omitted reporting review deficiencies because Arsenal documentation did not provide an audit trail. AEC did not maintain either documentation of the Rocky Mountain Arsenal quality assurance review or documentation of the reason AEC omitted reporting the results to the office of the Assistant Chief of Staff for Installation Management.

AEC assessments of BRAC installation estimates were inadequate to ensure the accuracy of the environmental liabilities. For example, we determined that two Fort Ord BRAC cleanup estimates did not have adequate documentation despite the AEC review conclusion that the estimates maintained adequate documentation. The Army Assistant Chief of Staff for Installation Management BRAC Division (BRAC Office) did not perform quality assurance reviews of the installations and no formal action was taken concerning AEC findings.

Non-DERP Quality Assurance. AEC non-DERP quality assurance reviews were generally restricted to the information within the database and were focused on ensuring that the projects had correct requirements, quality and accurate data, and justified funding purposes. The AEC non-DERP quality assurance reviews did not include reviews of source documentation or evaluate the estimate methodology or audit trail, which are elements required by the DoD FMR. Therefore, the reviews could not verify the existence, completeness, or valuation of the estimates.

DERP-FUDS Quality Assurance. DERP-FUDS activities did not implement quality control programs at the district or division level. Instead, the districts and divisions relied on the Omaha Center to perform quality control reviews. The Omaha Center reviews were limited in scope and were completed periodically when funding was available. Corps of Engineers districts and divisions did not always implement recommendations resulting from the Omaha Center reviews.

Estimator Qualifications. We reviewed estimator qualifications at each of the DERP active installations, FUDS, BRAC, and non-DERP locations audited. We found estimators properly qualified to perform environmental cost estimating at all 27 locations reviewed.

Compliance with Environmental Liabilities Guidance

DERP, BRAC, and non-DERP activities did not follow FMR guidance and DERP program guidance concerning environmental liability financial reporting. In addition, non-DERP activities lacked specific implementation guidance.

Financial Reporting Guidance. DERP and BRAC activities did not follow financial reporting guidance when reporting environmental liabilities. The DERP guidance requires complete disclosure of all environmental restoration liabilities to include having complete, formal, and auditable documentation of all data and other information used to develop the estimate of the environmental restoration liability. However, DERP and some BRAC activities did not follow this guidance, and the installations could not produce adequate audit trails. For example, one DERP active installation could not provide documentation to support any of the 15 estimates, valued at \$134 million, selected for our review. One DERP-FUDS activity could not provide adequate documentation to support any of the 70 estimates, valued at over \$604 million, selected for review. One BRAC site could not provide documentation to support 66 estimates, valued at approximately \$66.2 million, representing approximately 6 percent of total Army BRAC environmental liabilities.

DERP Guidance. Even though DERP active installation and FUDS guidance requires that all estimates prepared include all anticipated costs on a current cost basis, FUDS activities did not update and report all environmental liability costs in current year dollars. Of 300 FUDS estimates reviewed, 36 estimates, valued at approximately \$963 million, were not updated and reported in current year dollars. In addition, of 231 DERP active installation estimates reviewed, 45 estimates, valued at approximately \$836 million, were not updated and reported in current year dollars. Because these projects were not updated, the reported amount was not in accordance with financial reporting guidance and the liability could be misstated.

BRAC Guidance. The BRAC Office reduced FY 2002 environmental liability estimates by approximately \$382 million based on funding constraints. DoD FMR 7000.14-R, volume 4, chapter 14, states that availability of funds should not determine the liability. However, the BRAC Office applied predetermined criteria that included a self-generated \$1 billion ceiling constraint, which limited the total environmental liability recognized. Based on the constraints, BRAC Office officials either encouraged installations to revise estimates using a more optimistic approach or arbitrarily changed site estimates. A written explanation of BRAC Office reductions to estimates was not provided to BRAC installations. The use of budgetary constraints by the BRAC Office for reporting FY 2002 environmental liabilities did not adhere to the DoD FMR (see BRAC Issues in Appendix E).

Non-DERP Guidance. The Army did not establish guidance for developing estimates for non-DERP environmental liabilities. However, AEC did release an Environmental Program Requirements Project Catalog that contained sample projects to use when developing EPR estimates. In addition, one non-DERP activity did not follow financial reporting guidance and may have incorrectly reported \$15.16 million in environmental liabilities on the FY 2002 Note 14. Based on the FMR and other accounting guidance, the Army should have classified the environmental liabilities as contingent liabilities and should have been reported on Note 16 (see Financial Reporting Guidance in Appendix F).

Controls Over Feeder Systems

DERP and BRAC activities lacked effective and reliable controls over feeder systems. The non-DERP feeder system, Environmental Program Requirements (EPR) database, could not be reviewed because of inadequate documentation and lack of functionality to produce an audit trail. Internal controls for the Restoration Cost-to-Complete System/Defense Site Environmental Restoration Tracking System (RCTCS/DSERTS) feeder system for DERP active installations and BRAC activities and the FUDMIS feeder system for FUDS did not ensure that the systems effectively reflected the environmental FY 2002 liability estimates prepared at the installation level. DERP guidance requires the estimates and the values in the annual financial statements for environmental restoration to be consistent at the component and department levels. Only 339 of the 674 DERP active installation, FUDS, and BRAC feeder system estimates reviewed

accurately reflected environmental FY 2002 liability estimates prepared at the installation level. Table 4 provides a breakdown of estimates accurately reflected in the RCTCS/DSERTS and FUDSMIS feeder systems for DERP active installation, FUDS, and BRAC estimates.

Table 4. Adequacy of Environmental Liability Feeder Systems				
	<u>DERP</u>	<u>FUDS</u>	<u>BRAC</u>	<u>Totals</u>
Estimates Reviewed	231	300*	143	674
Estimates Accurately Reflected in Feeder Databases	68	197	74	339
<p>* The actual number of estimates that were updated with 2002 cost factors was 222. Therefore, the 186 estimates that were correctly reflected between the databases were from the sample of 222. The remaining 78 estimates were not updated to 2002 cost factors or did not have documentation to make a determination. Refer to Appendix D for additional discussion.</p>				

For example, only 8 of the 36 estimates reviewed at Redstone Arsenal were consistent with estimates in the reporting database. At Dugway Proving Ground, the supporting database did not agree with 42 of 44 estimates reviewed, in part because of a lack of communication between the location and AEC personnel. This resulted in AEC inserting prior year estimates into the database rather than revised estimates. At Fort McClellan, estimates submitted for reporting purposes and estimates to the reported database were inconsistent by approximately \$54.28 million. These inconsistencies occurred because AEC personnel and BRAC Office made changes to the estimates without documenting them or adjusting the original estimates, causing the reporting database to reflect inaccurate data.

The Corps of Engineers did not have adequate internal controls in place to ensure that their personnel input accurate data into FUDSMIS. For 300 FUDSMIS database entries valued at approximately \$5.9 billion, Corps of Engineers districts could provide documentation to support approximately \$4.2 billion. Corps of Engineers district personnel could not explain why the estimates did not match the database and what represented the \$1.7 billion difference. Because of the lack of consistency between the supporting database and changes by upper management, an audit trail that would allow an auditor to review the supporting documentation did not exist.

Management Actions

The DERP and non-DERP programs have undertaken some management actions for the deficiencies identified. For the DERP program, AEC developed and released the Army Environmental Database Restoration feeder system for use in

the Army FY 2003 DERP active installation and BRAC data call to integrate the Defense Site Environmental Restoration Tracking System (DSERTS) and the Restoration Cost-to-Complete System (RCTCS) databases. The Army Environmental Database Restoration feeder system is capable of importing RACER estimates as well as entering and revising cost-to-complete estimates and is a more automated process that will reduce the possibility of errors. In addition, the Environmental Database Restoration feeder system will allow estimators to revise estimates without creating a discrepancy between the RACER estimate and the feeder systems. AEC is also developing the Army Environmental Database-Cleanup Compliance feeder system for non-DERP estimates for use in FY 2005. The Army Environmental Database-Cleanup Compliance will have the same capabilities as the Army Environmental Database Restoration feeder system.

The Corps of Engineers is in the process of creating a FUDS Information Improvement Plan. The goals of the plan are to direct that:

- all FUDS properties/projects are documented and maintained in accordance with DoD and Corps of Engineers policy and regulations;
- FUDS estimates are properly developed and reviewed for quality, technical adequacy, reasonableness, are properly documented; and
- estimate entries are consistent with FUDSMIS.

Implementation of the plan was scheduled for April 2004.

The non-DERP program has also initiated corrective action. The Office of the Deputy Under Secretary of Defense (Installations and Environment) is developing a non-DERP financial reporting policy that discusses definitions for environmental liabilities, identification and differences between environmental liabilities, accounting treatments, estimate methodology, and criteria for determining the type of liability to be reported. The policy also covers environmental liabilities for the Army Chemical-Demilitarization program and disposal of Navy nuclear-powered ships. The Deputy Under Secretary (Installations and Environment) will issue the policy during FY 2004. The Army also plans to develop non-DERP specific program guidance.

The Army is also developing environmental liability control improvements to be implemented in the Army Chief Financial Officer Strategic Plan the Army Environmental Cleanup Strategic Plan and individual program management strategic plans for DERP active installations, DERP-FUDS, BRAC and non-DERP programs. The expected completion date for the strategic plan implementation is September 2005.

Management Comments on Finding A and Audit Response

Summaries of management comments on finding A and our audit response are in Appendix G.

Appendix H**DAIM-ZA Memorandum, 18 November 2004, Subject: Improving the Reporting of Financial Liabilities.**

The following Department of Army memorandum established specific review and quality assurance/quality control responsibilities for each cleanup program. It further required immediate implementation to ensure CTC efforts during FY2005 provided for sound and audible estimates.

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ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
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DAIM-ZA

NOV 18 2004

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Improving the Reporting of Environmental Liabilities

1. References:

a. Memorandum, Department of the Army, Office of the Assistant Chief of Staff for Installation Management, 30 Jul 04, SAB.

b. Environmental Liabilities Required To Be Reported on Annual Financial Statements (Report No. D-2004-080), Inspector General, Department of Defense, dated 5 May 04.

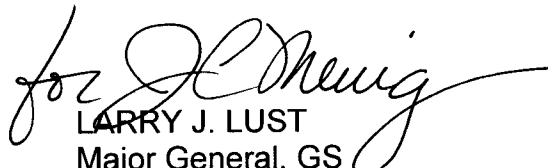
2. Reference 1a transmitted the Correction Action Plans developed to address deficiencies in the reporting of environmental liabilities documented by the DOD Inspector General (ref 1b). Deficiencies noted in the DODIG report included the need to conduct and document supervisory review of cost-to-complete estimates and the need for consistent quality control (QC) and quality assurance (QA) procedures to ensure our estimates are complete and auditable.

3. The enclosed matrix (Responsibilities for Cost-to-Complete and Financial Liabilities) establishes specific review and QA/QC responsibilities, for each of the cleanup programs, to be implemented by your organizations in future cost-to-complete development efforts. Where the specific office listed in the table does not match the existing installation or command structure of your organization, an equivalent office should be used to conduct the assigned function.

4. We must implement these review procedures immediately to ensure cost-to-complete development efforts during fiscal year 2005 provide sound and auditable estimates of our environmental liabilities.

5. The point of contract is Mr. James Daniel, DAIM-EDC, (703) 601-1590, e-mail James.Daniel@hqda.army.mil.

Encl


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Major General, GS
Assistant Chief of Staff
for Installation Management

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Responsibilities for Cost-to-Complete and Financial Liabilities

ACTIONS	Army DERP Active / Excess Installations	Base Realignment and Closure and Excess Installations CC	Formerly Used Defense Sites	Compliance-Related Cleanup (Special Installations)
Develop CTC Estimates	Installation RPM (AEC for NGB)	BRAC Environmental Coordinator	USACE District Project Manager	Installation CC - RPM
Supervisory Review	DPW / BRAC Fld Ofc Env Lead *	BRAC Field Office Env Lead	USACE District Program Manager	Dir. of Public Works or Equivalent
Quality Control	USAECE Cleanup Division **	USAECE Cleanup Division	USACE District QC Team	MSC or MACOM Envmntl Chief
Quality Assurance	USAECE Cleanup PM Branch	USAECE Cleanup PM Branch	USACE Division FUDS Mgr ***	USAECE Cleanup PM Branch
Approval	USAECE Program Manager	BRAC Division Env & Rsce Mgr	USACE HQ FUDS Program Mgr	MACOM Environmental Chief
Validation	ACSIM Dir Envir. Prgm	ACSIM BRAC Division Chief	ACSIM Dir Envir. Prgm	MACOM Envir. Chief / Acq PM

ACTIONS	Compliance-Related Cleanup (IMA CONUS and OCONUS)	Compliance-Related Cleanup (NGB)	Massachusetts Military Rsvn Compliance-Related Cleanup (AEC/NGB)	Compliance-Related Cleanup (USAR RRC/Installation)
Develop CTC Estimates	Installation CC - RPM	Installation CC - RPM	PM MMR	Installation/RRC CC - RPM
Supervisory Review	DPW/Dep Garrison Cmdr	Facilities Mgt Officer / Ch of Staff	USAECE Deputy to the Cmdr	DCS Engineer/DPW
Quality Control	IMA Region Env Chief	NGB Envir. Prog. Div. Cleanup Br.	USAECE Cleanup Division	IMA ARD Envir. Chief
Quality Assurance	USAECE Cleanup PM Branch	USAECE Cleanup PM Branch	USAECE Cleanup PM Branch	USAECE Cleanup PM Branch
Approval	IMA Environmental Chief	NGB Environmental Chief	NGB Environmental Chief	IMA Environmental Chief
Validation	ACSIM Dir Envir. Prgm	ACSIM Dir Envir. Prgm	ACSIM Dir Envir. Prgm	ACSIM Dir Envir. Prgm

ACTION DESCRIPTIONS

Develop Cost-to-Complete Estimates: Staff prepares site level cost to complete estimates using RACER or engineered estimates. Estimates must be auditable. Data is entered into database of record (i.e. AEDB-R, AEDB-CC, FUDSMIS).

Supervisory Review: Supervisor of staff preparing CTC estimate must review the estimate and sign off on the Supervisory Review Checklist. * Dep. Environmental Chief for NGB.

Quality Control: Reviews estimates for completeness. Checks if assumptions are valid. ** Includes NGB AEC Liaison for NGB installations.

Quality Assurance: Randomly selects certain estimates for thorough review. Checks to see if estimates are auditable. *** May use Center of Expertise.

Approval: Cleanup Program Managers have to approve estimates used for reporting their program's environmental liabilities.

Validation: ACSIM collects and validates environmental liabilities submitted by each cleanup program. Checks to see if all necessary program aspects are identified and reported.

Enclosure

Appendix I**Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects.**

The following Earth Tech, Inc., developed documents describes the data input rules and assumptions to be used in developing the FUDS Wrapper software tool used with the Remedial Action Cost Engineering and Requirements (*RACER*) System application.

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Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects

Contract DACA87-00-D-0027

Task Order 0038

**Prepared by:
Earth Tech, Inc.**

**Prepared for:
U.S. Army Corps of Engineers
Hazardous, Toxic & Radioactive Waste Center of Expertise
and
U.S. Army Corp of Engineers
Military Munitions Center of Expertise**

January 2005

Table of Contents

1.	Introduction.....	1
1.1	Overview	1
1.2	Purpose.....	1
1.3	References	1
1.3.1	Scope of Services	1
1.3.2	Regulation No. 200-3-1	1
1.4	Document Overview	1
1.5	Acronyms and Abbreviations	1
2.	General Information.....	4
2.1	Level Names	4
2.2	Level 1 Categories.....	4
2.3	Level 2 Types	4
2.4	Location Modifiers	4
2.5	Safety Level	5
2.6	Productivity	5
2.7	Markup Templates	5
2.8	No Markup Assemblies	5
2.9	Assembly Cost Database	6
2.10	Analysis Rates	6
2.11	Analytical Templates	6
2.11.1	System Soil - Ordnance Residual (Modified)	6
2.11.2	System Water - Ordnance Residual (Modified).....	7
2.11.3	FUDS - MC Soil	7
2.12	Professional Labor Rates	7
2.13	Professional Labor Templates	8
3.	Level 1 – FUDS Property	9
4.	Level 2 – Project	11
5.	Level 3 - Phases Estimated.....	15
5.1	Site Inspection (SI) Phase.....	15
5.1.1	Site Inspection.....	16
5.1.1.1	System Definition Tab.....	16
5.1.1.2	Planning Tab.....	16
5.1.1.3	Site Investigation Tab	16
5.1.1.4	S&A Tab.....	18
5.1.1.5	Media Tab.....	19
5.1.1.6	Methodology Tab.....	21
5.1.1.7	Comments Tab.....	21
5.2	Remedial Investigation/Feasibility Study (RI/FS) Phase	22
5.2.1	MEC Site Characterization and Removal Assessment.....	25
5.2.1.1	System Definition Tab.....	25
5.2.1.2	Scoping/Management Tab	31
5.2.1.3	Site Planning Tab.....	31
5.2.1.4	Site Characterization Tab.....	33
5.2.1.5	Alternative Analysis/Reporting Tab	34
5.2.1.6	Comments Tab.....	34
5.2.2	Remedial Investigation	35
5.2.2.1	System Definition Tab.....	35
5.2.2.2	Scoping Tab.....	36
5.2.2.3	Site Characterization Tab.....	36
5.2.2.4	S&A Tab.....	38
5.2.2.5	Media Tab.....	39
5.2.2.6	Methodology Tab.....	41
5.2.2.7	Comments Tab.....	41

5.2.3	Feasibility Study	42
5.2.3.1	System Definition Tab.....	42
5.2.3.2	Scoping Tab.....	43
5.2.3.3	Development Tab	43
5.2.3.4	Analysis Tab	44
5.2.3.5	Remedy Selection Tab.....	44
5.2.3.6	Comments Tab.....	45
5.2.4	Groundwater Monitoring Well	45
5.2.4.1	System Definition Tab.....	46
5.2.4.2	Aquifer One Tab	46
5.2.4.3	Comments Tab.....	47
5.3	Remedial Design (RD) Phase.....	47
5.4	RA-C for MEC Phase.....	49
5.4.1	MEC Institutional Controls	50
5.4.1.1	System Definition Tab.....	50
5.4.1.2	Planning Tab.....	51
5.4.1.3	Implementation Tab	51
5.4.1.4	Training & Follow-up Tab	51
5.4.1.5	Comments Tab.....	51
5.4.2	MEC Removal Action	52
5.4.2.1	System Definition Tab.....	52
5.4.2.2	Removal Area Tab	53
5.4.2.3	Surveying Tab	55
5.4.2.4	Vegetation Removal Tab.....	55
5.4.2.5	UXO Mapping Tab.....	56
5.4.2.6	UXO Removal Tab	57
5.4.2.7	Site Management Tab.....	57
5.4.2.8	Reporting and Stakeholder Involvement Tab	58
5.4.2.9	Comments Tab.....	58
5.4.3	MEC Sifting.....	59
5.4.3.1	System Definition Tab.....	59
5.4.3.2	Site Preparation Tab.....	60
5.4.3.3	Excavation Tab	61
5.4.3.4	Sifting Tab	61
5.4.3.5	Backfill Tab	63
5.4.3.6	Site Management Tab.....	63
5.4.3.7	Comments Tab.....	63
5.5	RA-C for MC Phase	64
5.5.1	Excavation (Small Arms and Recreational Skeet).....	65
5.5.1.1	System Definition Tab.....	65
5.5.1.2	Comments Tab.....	67
5.5.2	Excavation (Hand Grenades and Explosive Contaminated Soil).....	67
5.5.2.1	System Definition Tab.....	67
5.5.2.2	Comments Tab.....	68
5.5.3	Off-site Transportation and Waste Disposal	69
5.5.3.1	System Definition Tab	69
5.5.3.2	Waste Disposal Tab	69
5.5.3.3	Disposal Fees Tab.....	70
5.5.3.4	Comments Tab.....	70
5.5.4	Cleanup and Landscaping	70
5.5.4.1	System Definition Tab.....	71
5.5.4.2	Landscaping Tab.....	71
5.5.4.3	Comments Tab.....	71
5.5.5	Professional Labor Management	72
5.5.5.1	System Definition Tab.....	72
5.5.5.2	Comments Tab.....	72

-FINAL

5.6	Long Term Management (LTM) Phase.....	73
5.6.1	MEC Monitoring.....	73
5.6.1.1	System Definition Tab.....	73
5.6.1.2	Visit/Planning Tab	74
5.6.1.3	Documentation Tab	74
5.6.1.4	Comments Tab.....	75
5.7	Project Closeout (PCO) Phase	76
5.7.1	Site Closeout Documentation	76
5.7.1.1	System Definition Tab.....	76
5.7.1.2	Meetings Tab	77
5.7.1.3	Documents Tab	77
5.7.1.4	Comments Tab.....	78
6.	Input Data Dictionary	79

Table of Figures

Table 1 – Acronyms and Abbreviations	2
Table 2 - Level Names for FUDS MMRP CTC Estimates.....	4
Table 3 - User-Defined Assemblies	6
Table 4 - System Soil - Ordnance Residual (Modified) Analytical Template	7
Table 5 - System Water- Ordnance Residual (Modified) Analytical Template	7
Table 6 - FUDS - MC Soil Analytical Template.....	7
Table 7 – Data Entry Rules for Level 1 Screen	9
Table 8 – Data Entry Rules for Level 2 Screen	11
Table 9 – Data Entry Rules for SI Phase	15
Table 10 – Data Entry Rules for the System Definition Tab in the Site Inspection Technology.....	16
Table 11 – Data Entry Rules for the Planning Tab in the Site Inspection Technology.....	16
Table 12 – Data Entry Rules for the Site Investigation Tab in the Site Inspection Technology	16
Table 13 – Data Entry Rules for the sampling & Analysis (S&A) Tab in the Site Inspection Technology .	18
Table 14 – Data Entry Rules for the Media Tab in the Site Inspection Technology	19
Table 15 - Soil Sampling Locations for Site Inspection Based on Former Use/Range Type.....	20
Table 16 – Data Entry Rules for the Methodology Tab in the Site Inspection Technology	21
Table 17 – Data Entry Rules for the RI/FS Phase	23
Table 18 – Data Entry Rules for the System Definition Tab in the MEC Site Characterization and Removal Assessment Technology	25
Table 19 - FUDSMIS Topography and Corresponding <i>RACER</i> Topography	27
Table 20 - FUDSMIS Vegetation and Corresponding <i>RACER</i> Vegetation.....	27
Table 21 - FUDSMIS Former Uses and Corresponding <i>RACER</i> Range Types.....	28
Table 22 - FUDSMIS Munitions Types and Corresponding <i>RACER</i> Ordnance Types	28
Table 23 - Complexity for MEC Models using Topography and Vegetation Types	31
Table 25 – Data Entry Rules for the Site Planning Tab in the	31
Table 26 – Data Entry Rules for the Site Characterization Tab in the	33
Table 27 – Data Entry Rules for the Alternative Analysis/Reporting Tab	34
Table 28 – Data Entry Rules for the System Definition Tab in	35
Table 29 – Data Entry Rules for the Scoping Tab in	36
Table 30 – Data Entry Rules for the Site Characterization Tab.....	36
Table 31 – Data Entry Rules for the S&A Tab in the Remedial.....	38
Table 32 – Data Entry Rules for the Media Tab in the	39
Table 33 Sampling Locations for RI/FS	40
Table 34 – Data Entry Rules for the Methodology Tab in the	41
Table 39 – Data Entry Rules for the Remedy Selection Tab in the Feasibility Study Technology	44
Table 41 – Data Entry Rules for the Aquifer One Tab in the Groundwater Monitoring Wells Technology	46
Table 42 – Data Entry Rules for the Remedial Design Phase Screen.....	47
Table 43 – Data Entry Rules for the RA-C Phase for MEC	49
Table 44 – Data Entry Rules for the System Definition Tab in the MEC Institutional Controls Technology	50
Table 45 – Data Entry Rules for the Planning Tab in the MEC Institutional Controls Technology	51
Table 46 – Data Entry Rules for the Implementation Tab in the MEC Institutional Controls Technology .	51
Table 47 – Data Entry Rules for the Training & Follow-up Tab in the MEC Institutional Controls Technology	51
Table 48 – Data Entry Rules for the System Definition Tab in the MEC Removal Action Technology	52
Table 49 – Data Entry Rules for the Removal Area Tab in the MEC Removal Action Technology.....	53
Table 50 – Data Entry Rules for the Surveying Tab in the MEC Removal Action Technology	55
Table 51 – Data Entry Rules for the Vegetation Removal Tab in the MEC Removal Action Technology .	55
Table 52 – Data Entry Rules for the UXO Mapping Tab in the MEC Removal Action Technology	56
Table 53 – Data Entry Rules for the UXO Removal Tab in the MEC Removal Action Technology	57
Table 54 – Data Entry Rules for the Site Management Tab in the MEC Removal Action Technology.....	57
Table 55 – Data Entry Rules for the Reporting and Stakeholder Involvement Tab in the MEC Removal Action Technology	58

Table 56 – Data Entry Rules for the System Definition Tab in the MEC Sifting Technology	59
Table 57 – Soil Types	60
Table 58 – Data Entry Rules for the Site Preparation Tab in the MEC Sifting Technology	60
Table 59 – Data Entry Rules for the Excavation Tab in the MEC Sifting Technology	61
Table 60 – Data Entry Rules for the Sifting Tab in the MEC Sifting Technology	61
Table 61 – Data Entry Rules for the Backfill Tab in the MEC Sifting Technology	63
Table 62 – Data Entry Rules for the Site Management Tab in the MEC Sifting Technology	63
Table 63 – Data Entry Rules for the RA-C Phase for MC.....	64
Table 64 – Data Entry Rules for the System Definition Tab in the Excavation Technology for Small Arms and Recreational Skeet	66
Table 65 – Data Entry Rules for the System Definition Tab in the Excavation Technology for Hand Grenades and Explosive Contaminated Soil	67
Table 66 – Data Entry Rules for the System Definition Tab in the Off-Site Transportation and Waste Disposal Technology	69
Table 67 – Data Entry Rules for the Waste Disposal Tab in the Off-Site Transportation and Waste Disposal Technology	69
Table 68 – Data Entry Rules for the Disposal Fees Tab in the Off-Site Transportation and Waste Disposal Technology	70
Table 69 – Data Entry Rules for the System Definition Tab in the Cleanup and Landscaping Technology	71
Table 70 – Data Entry Rules for the Landscaping Tab in the Cleanup and Landscaping Technology	71
Table 71 – Data Entry Rules for the System Definition Tab in the Professional Labor Management Technology	72
Table 72 – Data Entry Rules for the LTM Phase	73
Table 73 – Data Entry Rules for the System Definition Tab in the MEC Monitoring Technology	73
Table 74 – Data Entry Rules for the Visit/Planning Tab in the MEC Monitoring Technology	74
Table 75 – Data Entry Rules for the Documentation Tab in the MEC Monitoring Technology	74
Table 76 – Data Entry Rules for the PCO Phase.....	76
Table 77 – Data Entry Rules for the System Definition Tab in the Site Closeout Documentation Technology	76
Table 78 – Data Entry Rules for the Meetings Tab in the Site Closeout Documentation Technology	77
Table 79 – Data Entry Rules for the Documents Tab in the Site Closeout Documentation Technology ..	77
Table 80 - Property Table.....	79
Table 81 - Project Table	80
Table 82 - Area Table	81

1. Introduction

1.1 Overview

For projects in the Formerly Used Defense Sites (FUDS) Military Munitions Response Program (MMRP) considered to have future Environmental Liabilities (EL), the cost-to-complete (CTC) estimates are based on project-specific data from FUDS Management Information System (FUDSMIS) using rules and assumptions gathered from the United States Army Corp of Engineers (USACE) experience with MMRP remediation and USACE engineering judgment. These rules and assumptions transform the project-specific data into parameter inputs for entry into the Remedial Action Cost Engineering Requirements (*RACER*[™]) software system. This document contains the rules and assumptions for that transformation. The input data dictionary is included in Section 6 of this document. The data dictionary defines each FUDSMIS data element and describes where the input is used within the *RACER* estimate.

1.2 Purpose

The purpose of this document is to describe the data input rules and assumptions to be used in developing the FUDS Wrapper software application.

1.3 References

1.3.1 Scope of Services

Scope of Services titled "Development of MMRP Cost to Complete Estimates to Support the Annual Report to Congress Using the Remedial Action Cost Engineering and Requirements (*RACER*) System 2004 and 2005 and a Post Processor System to Develop Uploadable Data from *RACER* Databases Created into FUDSMIS", 15 July 2004.

1.3.2 Regulation No. 200-3-1

Regulation No. 200-3-1, "Environmental Quality, Formerly Utilized Defense Sites (FUDS) Program Policy", 10 May 2004.

1.4 Document Overview

This document presents the rules and assumptions for developing MMRP estimates for FY05. Section 1 provides an introduction to the document along with references and definitions of acronyms and abbreviations used throughout the document. Details regarding general conventions that will be used in developing the MMRP estimates for Fiscal Year (FY) 2005 are described in Section 2. Sections 3 and 4 provide the data entry rules for Level 1 (FUDS property) and Level 2 (Project) in the *RACER* hierarchy. The data entry rules and parameter assumptions for Level 3 (phases) and Level 4 (technology) are described in Section 5. A data dictionary for the input data supplied by USACE is provided in Section 6.

1.5 Acronyms and Abbreviations

There are many acronyms and abbreviations used through out this document. Table 1 provides definitions for these acronyms and abbreviations.

Table 1 – Acronyms and Abbreviations

Acronym / Abbreviation	Definition
ASR	Archives Search Report
CTC	Cost to Complete
EL	Environmental Liability
CX	Center of Expertise
CY	Cubic Yard
DoD	Department of Defense
FS	Feasibility Study
FSP	Field Sampling Plan
FUDS	Formerly Utilized Defense Sites
FUDSMIS	FUDS Management Information System
FY	Fiscal Year
HASP	Health and Safety Plan
HTRW	Hazardous, Toxic, and Radioactive Waste
LTM	Long Term Management/Monitoring
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MM	Military Munitions
MMR	Military Munitions Response
MMRP	Military Munitions Response Program
OB/OD	Open Burn/Open Detonation
OEC	MEC Site Characterization and Removal Assessment
OER	MEC Removal Action
PA	Preliminary Assessment
PCO	Project Closeout
POC	Point of Contact
PPE	Personnel Protective Equipment
QAPP	Quality Assurance Project Plan
QA	Quality Assurance
QC	Quality Control
RAC	Risk Assessment Code

Acronym / Abbreviation	Definition
RA-C	Remedial Action – Construction
<i>RACER</i>	Remedial Action Cost Engineering Requirements
R&D	Research and Development
RD	Remedial Design
RI	Remedial Investigation
ROD	Record Of Decision
S&A	Sampling and Analysis
SI	Site Inspection
USACE	United States Army Corps of Engineers

2. General Information

The *RACER* system has a number of features, called “Preferences”, which can be tailored to meet the requirements of the user. The FUDS program utilizes several of *RACER*’s preferences in its CTC estimates. The following are specific areas where *RACER* 2005 preferences will be used to tailor the FY05 MMRP CTC estimates to reflect USACE business practices.

2.1 Level Names

RACER utilizes a multi-level hierarchy to organize CTC estimates. *RACER* enables the user to modify the default names assigned to several of the estimating levels. For the purposes of the FY05 MMRP CTC estimates, the level names presented in Table 2 will be used.

Table 2 - Level Names for FUDS MMRP CTC Estimates.

Level No.	Default Name	FUDS CTC Name
0	Folder	Folder
1	Project	FUDS Property
2	Site	Project
3	Phase	Phase
4	Technology	Technology

2.2 Level 1 Categories

RACER enables users to define categories for their estimates. Once the user has defined categories, the user can assign each estimate to the appropriate category using a dropdown list on the Level 1 screen. The Level 1 category preference will not be used in developing the FY 05 FUDS MMRP CTC estimates.

2.3 Level 2 Types

RACER enables users to define types for their estimates. Once the user has defined types, the user can assign each estimate to the appropriate type using a dropdown list on the Level 2 screen. The Level 2 type preference will be used in developing the FY 05 FUDS MMRP CTC estimates. In particular, all FUDS MMRP CTC estimates developed under this Task Order will use MMRP as the Level 2 type.

2.4 Location Modifiers

RACER enables users to select a default location for their estimates. This preference is helpful if the user is developing estimates for a particular installation or facility. Since the FUDS MMRP CTC estimates will address many FUDS properties at many geographic locations, this preference will not be used.

2.5 Safety Level

The Safety Level preference defines the level of Personnel Protective Equipment (PPE) required to perform the work. *RACER* enables the user to specify the default safety level by phase of work. Safety Level “E” is the normal level of protection for investigation and remediation of Munitions and Explosives of Concern (MEC). *RACER* default safety levels will be modified as follows:

- **All Phases:**
 - Use Safety Level “E”.

2.6 Productivity

RACER enables users to define productivity losses associated with each safety level. The *RACER* default productivity losses will be used in developing the FUDS MMRP CTC estimates.

2.7 Markup Templates

Markup templates apply multipliers to the *RACER* CTC estimates to include indirect costs for profit, overhead, risk, and general conditions for elements of the estimate including professional labor, craft labor, equipment, and materials for both prime and subcontractors. The FUDS markup templates were supplied by the USACE Hazardous, Toxic, and Radioactive Waste Center of Expertise (HTRW-CX). The FUDS markup templates and the appropriate phases for each markup template are listed below. The FUDS markup templates are based on the *RACER* System Default markup template except for the factors specifically identified below.

- V7 – FUDS PA, SI, RI/FS, EE/CA Phase Template:
 - Owner Costs 12%
 - Contingencies 5%
- V7 - FUDS RD, RmD, RA-C, RmA-C, IRA, RA-C Phase Template:
 - Owner Costs = 13%
 - Contingencies = 15%
- V7 - FUDS LTM Phase Template:
 - Owner Costs = 2%
 - Contingencies = 5%
- V7 - FUDS PCO Phase Template:
 - Owner Costs = 0%
 - Contingencies = 0%

2.8 No Markup Assemblies

RACER enables users to specify individual assemblies that are not to be subjected to the markup calculations. This preference generally is used when the user has defined a new assembly or modified the price for a new assembly using fully-loaded contract rates. The following assemblies will not be marked up for the FUDS MMRP CTC estimates:

- 33197283 - Landfill hazardous solid bulk waste, Requiring stabilization

The justification of not applying mark-ups to the above assembly is that the cost in the database is equivalent to a fully mark-up cost and if the mark up is applied the cost will not be equivalent to costs obtained from district personnel.

2.9 Assembly Cost Database

RACER enables users to define new assemblies needed to create their estimates, and to edit the prices for existing assemblies in the *RACER* database. The user-defined assemblies listed in Table 3 will be added to the *RACER* database and used in developing the FUDS MMRP CTC estimates for FY05.

Table 3 - User-Defined Assemblies

Assembly	Description	Material Cost	Labor Cost	Equipment Cost
33029501	Lead by ICP/AES (SW6010B) (SW6010B)	\$32.00	\$0.00	\$0.00
33029502	Perchlorate LC / MS / MS Method Number 331	\$300.00	\$0.00	\$0.00

2.10 Analysis Rates

RACER enables users to specify the prices for laboratory analysis using a preference called "Analysis Rates". This preference is generally used when the user has contracts with specific laboratories specifying prices for specific analyses. This preference will not be used in developing the FUDS MMRP CTC estimates for FY05.

2.11 Analytical Templates

Analytical templates establish groups of analyses that can be selected at the technology level. Analytical templates define a list of applicable lab analyses for various combinations of contaminants and media. The following analytical templates will be used as indicated:

2.11.1 System Soil - Ordnance Residual (Modified)

This custom analytical template may be used in the Site Inspection (SI) technology in the SI phase, in the Remedial Investigation technology in the Remedial Investigation and Feasibility Study (RI/FS) phase and in the Excavation Technology in the Remedial Action-Construction (RA-C) phase when more than lead is anticipated. The laboratory analyses that constitute this analytical template are listed in Table 4.

**Table 4 - System Soil - Ordnance Residual (Modified)
Analytical Template**

Assembly	Description
33022401	EPA Method 8330A (11 Compounds) Nitroaromatics/Nitramines
33022402	Nitroglycerine
33029501	Lead by ICP/AES (SW6010B)
33021650	Ion Chromatography (EPA 300)
33021709	TAL Metals (EPA 6010/7000s), Soil Analysis

2.11.2 System Water - Ordnance Residual (Modified)

This custom analytical template may be used in the RI technology in the RI/FS phase. The laboratory analyses that are included in this template are listed in Table 5.

**Table 5 - System Water- Ordnance Residual (Modified)
Analytical Template**

Assembly	Description
33022401	EPA Method 8330A (11 Compounds)
33029502	Perchlorate LC/MS/MS Method # 331

2.11.3 FUDS - MC Soil

This custom analytical template may be used in the SI technology in the SI phase, in the RI technology in the RI/FS phase and in the Excavation Technology in the RA-C phase. This template will only be used when lead is the only expected Munitions Constituent (MC) at the project. The laboratory analyses that are included in this template are listed in Table 6.

Table 6 - FUDS - MC Soil Analytical Template

Assembly	Description
33029501	Lead by ICP/AES (SW6010B)

2.12 Professional Labor Rates

RACER enables users to specify the prices for professional workers using a preference called "Labor Rates". This preference is generally used when the user has contracts with specific architect/engineering firms or environmental consulting firms specifying prices for specific labor categories such as scientists and engineers. This preference will not be used in developing the FUDS MMRP CTC estimates for FY05.

2.13 Professional Labor Templates

RACER enables users to develop templates for professional labor activities. This preference generally is used when the user needs to repetitively estimate costs for activities performed by professionals. This preference will not be used in developing the FUDS MMRP CTC estimates for FY05.

3. Level 1 – FUDS Property

As discussed in Section 2.1, Level 1 in the *RACER* estimating hierarchy will be used to organize estimates by FUDS property. The FUDS Wrapper software application will create a FUDS Property for each Property record from FUDSMIS that has one or more projects requiring a CTC estimate. A property will be created for each Property record that has at least one project that is not excluded. The data entry fields on the Level 1 screen in *RACER* will be used as described in Table 7.

Table 7 – Data Entry Rules for Level 1 Screen

Data Entry Field on Level 1 Screen	Data to be Entered and Associated Rules
FUDS Property ID	<Property.PropNumber>
FUDS Property Name	<Property.PropName>
Description	<p>For the Military Munitions Response Program (MMRP) projects without a decision document that are associated with this property, the cost-to-complete (CTC) estimate is developed using an “automated batch” process using project-specific data from the Formerly Used Defense Site Management Information System (FUDSMIS) on <INSERT DATA DATE> with rules and assumptions gathered from the United States Army Corp of Engineers (USACE) experience with MMRP remediation and engineering judgment. These rules and assumptions transform the selected project-specific data elements into required and secondary parameter inputs for the estimate. The rules and assumptions document titled “Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects” contains all of the information pertaining to the transformation.</p> <p>The property information used to develop this estimate is the from FUDSMIS data field title Total Property Acreage (From FDE), which is < Insert Property.TotalPropertyArea> acres. This acreage is obtained from the Property INPR Findings and Determination of Eligibility Statement.</p> <p>The city and state selected for this estimate is based upon the city and state identified from the property data fields in FUDSMIS for the city and state. If an exact match could not be made between the location in FUDSMIS and the locations in the <i>RACER</i> database, the state average was selected.</p> <p>User-Defined Costs are the <i>RACER</i> default cost type option. This option allows the user to begin with the standard <i>RACER</i> database costs as well as modify the database by adding user defined assemblies and analytical templates. The default will be used.</p> <p>The data field property description from FUDSMIS is inserted below if populated in FUDSMIS. The property acreage, if mentioned in property description, may differ from that in the FUDSMIS Total Property Acreage data field, but note that</p>

Data Entry Field on Level 1 Screen	Data to be Entered and Associated Rules
	<p>acres mentioned in the description are not used in the automated batch process to develop the estimate. The discrepancy will be noted for review and if any inaccurate property acreage was used, the cost estimate team working with the districts will insure the correct acreage is used in the future and all documentation is updated support the correct acreage.</p> <p>INSERT < Property.PropertyDescription></p>
Category	None
Report Option	Fiscal year basis
Location	State = <Property.State> City = <Property.City> or If an exact match for the city is not found in <i>RACER</i> , the state average is used.
Modifiers	Selected based on the Location
Start Date	Current date
Cost basis	Use User-Defined Costs

4. Level 2 – Project

As discussed in Section 2.1, Level 2 in the *RACER* estimating hierarchy will be used to organize estimates by Project. The FUDS Wrapper software application will create a Project for each MMRP Project record downloaded from FUDSMIS.

To create the FUDS MMRP CTC estimates, it is necessary to determine the area to be characterized and/or cleared. The input data from FUDSMIS supplied by USACE includes acreage for each FUDS Property and one or more areas associated with each project. The FUDS Wrapper software application will determine the Project Area according to the following rules:

Project Area:

Case 1 – FUDS Property with One Project

Project Area = total property acres.

Case 2 - FUDS Property with Multiple Projects

Project Area = sum of the land acres, up to 50 inland acres and up to 50 tidal acres for the areas in the project.

Special Conditions:

Case 1 - Project includes a training maneuver area

Project Area = limited to 100,000.

Case 2 – Project Area is Null or Zero

If the project area is null or zero, no estimate will be created.

Case 3 – No MMR Area Records Available

If the Project has no MMR area records, no estimate will be created.

The data entry rules and assumptions for the Level 2 (Project) screen are described in Table 8.

Table 8 – Data Entry Rules for Level 2 Screen

Data Entry Field on Level 2 Screen	Data to be Entered and Associated Rules
Project ID	<Project.Project Number>
Project Name	<Project.Project Name>
Project Type	MMRP
Setup Method	Template
Phase Types	Pre-Study Study Design Removal/interim Action Remedial Action Operations & Maintenance
	Selected Selected Selected Not Selected Selected Not Selected

Data Entry Field on Level 2 Screen	Data to be Entered and Associated Rules
	<div>Long-Term Monitoring</div> <div>Selected</div> <div>Site Close-Out</div> <div>Selected</div>
Phase Dates	See Sections 5.1, 5.2, 5.3, 5.4, 5.5, and 5.6 for phase sequencing rules.
Description	<p>The project estimate is based upon Military Munitions Response (MMR) area data elements downloaded from FUDSMIS on <insert date of data>. USACE collected the MMR data for each "range" or MMR area associated with this eligible FUDS project according to the Restoration Management Information System (RMIS) data structure issued by the Office of the Deputy Under Secretary of Defense for Installations and Environment (OSD) in October 2002, as well as the data structure for the Army Range Inventory Database (ARID) issued by the U.S. Army Environmental Center (AEC) in April 2002. AEC required the data for the Army Advanced Range Survey in December 2000, and OSD required the data for the MMR inventory requirements of the FY02 Defense Appropriations (Public Law 107-107), authorized in January 2002. The MMR data was obtained from the project's ASR, historic Army regulations, or additional historic records obtained during the MMR inventory effort. All MMR Inventory data is summarized in the project's ASR supplement, and information about how the data fields were populated, including explanations and citations of pertinent historic Army regulations, is provided in the USACE document, "Military Munitions Response Data Definitions." . <Insert Project.MMRSurvey POC> entered the MMR Area Information in FUDSMIS Contact information is as follows</p> <p>Phone: <Insert Project.MMRSurvey_Phone> Email: <Insert Project.MMRSurvey_Email ></p> <p><Eliminate this Paragraph when an estimate is not created- CASE 2 ></p> <p>The estimate for this project was generated using an automated batch process that was created by the Remediation Experts from the Military Munitions Center of Expertise (MM-CX), Jason Adams and Brad McCowan, and the Hazardous, Toxic, and Radioactive Waste Center of Expertise (HTRW-CX), Kate Peterson and Mike Crain. The estimate will include some or all of the following phases of the CERCLA remedial process: site inspection (SI), remedial investigation/feasibility study (RI/FS), remedial design (RD), remedial action (construction) (RA-C), long-term maintenance (LTM), and project closeout (PCO). The MMR data for each project dictates which of these phases are necessary. There are cases when the only phases needed are the SI and PCO or SI, RI/FS and PCO. The conditions for determining which phases to include according to the MMR data obtained from FUDSMIS are outlined in detail in the USACE document, "Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects".</p> <p>ALWAYS INSERT THE PROJECT PM</p>

Data Entry Field on Level 2 Screen	Data to be Entered and Associated Rules
	<p>Project POC: <insert Project.POC (Project PM)> Phone: <insert Project.Phone (Project PM)> Email: <insert Project.Email (Project. PM)></p> <p>If an estimate has previously been submitted for financial liability reporting purposes, it has been replaced with the new estimate derived from data downloaded from FUDSMIS on <Insert Data Date>, and the FY05 rules and assumptions (previously referenced), which were revised to comply with the revised Engineering Regulation 200-3-1 (FUDS ER) dated May 2004.</p> <p>Case 1 - If a estimate is created insert the following:</p> <p>Changes have been made between the rules and assumptions used for the 2003 CTC effort and the 2005 CTC effort to incorporate policy changes made in the FUDS ER and new information obtained from completed or ongoing MMRP investigations and cleanups. These changes include:</p> <ol style="list-style-type: none"> 1. Inclusion of the Site Inspection (SI) and Project Close Out (PCO) phases. 2. Addressing additional requirements for Munitions Constituents (MC) with more sampling and remedial action. 3. The calculations for Munitions and Explosives of Concern (MEC) removal acreage have be revised and are now based upon actual removal data from completed projects. The removal acreage in previous estimates was 5-20% of the total MMR Area based upon use. Now the removal acreage is calculated with the following formula, $Y = 100 * (19.715 * (\text{total property acreage} ^{-0.6921}))$ with an upper limit of 75% and lower limit of 7%, which is based upon a study of MMRP projects that are currently completed or underway. Information on the study can be obtained from Jason Adams and is outlined in the rules and assumptions document. 4. The requirements for the Long Term Management (LTM) Phase have changed from 9 events over 34 years to 6 events over 30 years. <p>Case 2 - If an estimate was not created:</p> <p>At this time, insufficient information is available to determine probable costs for this project. An ASR has not yet been finalized, and MMR data fields in FUDSMIS are not populated, upon which an estimate needs to be based, cannot yet be populated. Once an ASR is finalized and the MMR data fields populated in FUDSMIS, a cost estimate using the automated batch process can be generated.</p> <p>ALWAYS INSERT</p> <p>The following FUDSMIS project description text field from <Insert Date> data has been inserted to provide more information on the project, but is not used in determining acreages or clean up strategy. Only the data fields for Total Property Acreage and MMR Area Data are used. The project description is as follows; <Insert Project.MMRProjDesc></p>

Data Entry Field on Level 2 Screen	Data to be Entered and Associated Rules
Estimator Name	Jason B. Adams
Estimator Title	Cost Engineer
Estimator Agency	USACE
Estimator Business Address	CEHNC-ED-ES-C 4820 University Square Huntsville, AL 35816-1822
Estimator Email	Jason.B.Adams@usace.army.mil
Estimator Phone	256-895-1556
Estimate Prepared Date	<insert date of estimate developed>
Reviewer Name	<blank>
Reviewer Title	<blank>
Reviewer Agency	<blank>
Reviewer Business Address	<blank>
Reviewer Email	<blank>
Reviewer Phone	<blank>
Date Reviewed	<blank>

NOTE: Reviewer information is to be entered by the Districts.

5. Level 3 - Phases Estimated

As discussed in Section 2.1, Level 3 in the *RACER* estimating hierarchy will be used to organize estimates by phase of work. The FUDS Wrapper software application will create various phases for each MMRP Project according to the phase selection rules described in the subsections below.

5.1 Site Inspection (SI) Phase

The SI phase will be included for all MMRP projects requiring CTC estimates. The SI phase will be set up using the Pre-Study phase type in *RACER*. The data entry rules and assumptions for an SI phase are presented in Table 9.

Table 9 – Data Entry Rules for SI Phase

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
Phase Name	SI
Description	The Site Inspection (SI) is the second component of the Site Evaluation, following the Preliminary Assessment (PA). The SI is not intended as a full-scale study of the nature and extent of contamination or explosives hazards. To estimate the SI phase costs, the Site Inspection technology from Remedial Action Cost Engineering Requirement (<i>RACER</i>) is used to address both the Munitions Constituents (MC) and Munitions and Explosives of Concern (MEC) potential. The SI phase is created using the pertinent MMR Area Data Fields from FUDSMIS <INSERT DATA DATE>. Reference the document titled "Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects" for additional information.
Media/Waste Type	Ordnance (not residual)
Secondary Media/Waste Type	N/A
Contaminant	Ordnance (residual)
Secondary Contaminant	N/A
Approach	None
Phase Start Date	<insert Project.StartYear>
Labor Rate Group	System Defaults
Analysis Rate Group	System Defaults
Markup Template	V7 – FUDS PA, SI, RIFS, EE/CA Phase Template
Technology Markups	System Defaults

5.1.1 Site Inspection

The SI phase costs will be estimated using the SI technology in *RACER*. The SI technology will always be included in the SI phase. The data input rules and assumptions for the Site Inspection technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters are provided in the *RACER* help system.

5.1.1.1 System Definition Tab

**Table 10 – Data Entry Rules for the System Definition Tab
in the Site Inspection Technology**

Parameter	Data Entry Rules and Assumptions
Planning	Selected
Site Investigation	Selected
Install Groundwater Monitoring Wells	Not Selected
Sampling & Analysis (S&A)	Selected
Site Distance	250 miles
Site Complexity	High

5.1.1.2 Planning Tab

**Table 11 – Data Entry Rules for the Planning Tab
in the Site Inspection Technology**

Parameter	Data Entry Rules and Assumptions
Data Review	Selected
SI Work Plan	Selected
SI Supplemental Plans	Selected

5.1.1.3 Site Investigation Tab

**Table 12 – Data Entry Rules for the Site Investigation Tab
in the Site Inspection Technology**

Parameter	Data Entry Rules and Assumptions
Provide Fieldwork Support	Selected
Data Validation	Selected
Compose SI Report	Selected

-FINAL

Parameter	Data Entry Rules and Assumptions
Complete Revised HRS Scoring Package	Not Selected
Implement Community Relations Plan	Selected

5.1.1.4 S&A Tab

**Table 13 – Data Entry Rules for the Sampling & Analysis
(S&A) Tab in the Site Inspection Technology**

Parameter	Data Entry Rules and Assumptions
Sampling – Bioassays	Not Selected
Crew Size	2 Field Technicians
Include QA/QC Samples	Selected
Safety level	E
Sampling – Water	Groundwater = Not Selected
	Surface Water = Not Selected
Water Analytical Template	Primary = None
	Secondary = None
Sampling – Soil/Sediment	Surface Soil = Selected
	Subsurface Soil = Selected
	Sediment = Not Selected
Soil Analytical Template	Primary = Case 1: If the former uses include only air-to-air, air to ground, multi/combined use, other, R&D, recreational skeet, small arms or training maneuver area AND small arms (expended) or small arms (complete) is the only ordnance type for any MMR area: Template = FUDS – MC Soil Case 2: Otherwise: Template = System Soil – Ordnance Residual (Modified)
	Secondary = None
Sampling – Air/Soil Gas	Air = Not Selected
	Soil Gas = Not Selected
Air/Gas Analytical Template	Primary = None
	Secondary = None

5.1.1.5 Media Tab

**Table 14 – Data Entry Rules for the Media Tab
in the Site Inspection Technology**

Parameter	Data Entry Rules and Assumptions
Number of Sampling Locations – Surface Soil	<p>The total number of sampling locations is equal to the sum of the number of sampling locations for each former use within each MMR area as indicated in Table 15. The number of sampling locations is based on typical size and number of targets of the potential areas for MC.</p> <p>Case 1: If there is one MMR area, the maximum number of sampling locations is 50.</p> <p>Case 2: If there is more than one MMR area, the maximum is 100.</p> <p>Examples:</p> <ol style="list-style-type: none"> 1. If one MMR area had a historic use of bombing, the number of Sampling Locations would be 15. 2. If there were two MMR areas, the first area had a historic use of Training Area/Maneuver Area; the second area had Multiple Combined Use and Mortar. The total Number of sampling locations would be $10 + 15 + 15 = 40$ locations.
Surface Soil - # Samples per Location	1
Surface Soil - # Rounds	1
Subsurface Soil - Depth	2 feet depth for each subsurface location (Range studies conducted to date demonstrate that the majority of MEC is typically found within the first 2 feet of soil, therefore MC sampling should be conducted to a subsurface depth of 2 feet.
Subsurface Soil - # of Sampling Locations	The total number of sampling locations is equal to the sum of the number of sampling locations for each former use within each MMR area as indicated in Table 15. Sampling Locations. The number of sampling locations 15, 10 or 5 is based on typical size and number of targets of the potential areas for MC.

Parameter	Data Entry Rules and Assumptions
Subsurface Soil - # of Samples per Location	1
Subsurface Soil - # Rounds	1

**Table 15 - Soil Sampling Locations for Site Inspection
Based on Former Use/Range Type**

FUDSMIS Field Name Former Use/Range Type	Number of Soil Sampling Locations
Air2Air	10
Air2Ground	15
Artillery	15
Bombing	15
Buffer Area	5
Burial Pit	5
Explosive Contaminated Soil	5
Guided Missiles	15
Hand Grenade	5
Mortar	15
Multiple/Combined Use	15
OBOD	5
Other	5
R&D	5
RCRA Disposal	5
Recreational Skeet	5
Rifle Grenade, Anti-Tank Rocket	5
Small Arms, skeet	5
Training Area/Maneuver Area	10

5.1.1.6 Methodology Tab

**Table 16 – Data Entry Rules for the Methodology Tab
in the Site Inspection Technology**

Parameter	Data Entry Rules and Assumptions
Groundwater Wells	N/A
Subsurface Soil	Hand Auger
Soil Gas	N/A
Surface Water	N/A
Number of Wells Sampled per Day	N/A
Drum Purge Water	N/A
Turnaround Time	Standard
Quality Control	Level 3

5.1.1.7 Comments Tab

The following text will be entered onto the Comments tab in the Site Inspection technology:

The site complexity of the project was selected as high to ensure the integration of any Munitions Constituents (MC) and Munitions and Explosives of Concern (MEC) investigating and reporting. For estimating purposes, an assumption of 250 miles was used as the average distance to the project location.

The Ordnance Residual (Modified) and the FUDS MC Soil analytical templates are used to estimate sampling required to gain information about potential MC contamination, believed to be present at the project based upon the historical use (also referred to as former use) indicated by MMR area data for the project. The Ordnance Residual (Modified) analytical template is used when more than lead is suspected. The FUDS MC Soil analytical template is the only template used when only lead is suspected. This occurs when the Historical use (AKA as former use) includes only air-to-air, air to ground, multi/combined use, other, R&D, recreational skeet, small arms or training maneuver area **AND** small arms (expended) or small arms (complete) is the only munitions type for any MMR area.

The number of sampling locations is determined by the data element, historical use, of each MMR area for this project. Each historical use determines the number of sample locations based on typical size and number of targets of the potential areas for MC. The total number of sampling locations is equal to the sum of the number of sampling locations for each historical use within each MMR area as indicated in the table below. The maximum sample locations is limited by either of the following scenarios:

1. If there is only one MMR area, the maximum number of sampling locations is 50;
2. If there is more than one MMR area, the maximum number of sampling locations is 100.

FUDSMIS Field Name Historical Use/Range Type	Number of Soil Sampling Locations
Air2Air	10
Air2Ground	15
Artillery	15
Bombing	15
Buffer Area	5
Burial Pit	5
Explosive Contaminated Soil	5
Guided Missiles	15
Hand Grenade	5
Mortar	15
Multiple/Combined Use	15
OBOD	5
Other	5
R&D	5
RCRA Disposal	5
Recreational Skeet	5
Rifle Grenade, Anti-Tank Rocket	5
Small Arms, skeet	5
Training Area/Maneuver Area	10

For soil sampling, 1 surface sample and 1 subsurface sample at a depth of 2 ft are anticipated for each location since range studies conducted to date demonstrate that the majority of MEC is typically found within the first 2 feet of soil.

5.2 Remedial Investigation/Feasibility Study (RI/FS) Phase

The RI/FS phase will be included for all MMRP projects requiring CTC estimates that meet the following conditions:

- **Case 1** - If any of the MMR areas have a Risk Assessment Code (RAC) score of 1 through 4, AND the project acreage is greater than zero, AND the range type selections includes more than Air-to-Air Range.
- **Case 2** - The former uses of any of the MMR Areas include burial pits, guided missiles, hand grenades, OB/OD, Small Arms, Recreational Skeet, Explosive-contaminated soil or rifle grenade/anti-tank rocket. If OB/OD is the only former use

selected in any of the MMR areas and the RAC score for all the MMR areas is 5, the phase will not be created.

The RI/FS phase will be set up using the Study phase type in *RACER*. The data entry rules and assumptions for an RI/FS phase are presented in Table 17.

Table 17 – Data Entry Rules for the RI/FS Phase

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
Phase Name	RI/FS
Description	<p>The Remedial Investigation (RI) and Feasibility Study (FS) phase is included to characterize the project for the purpose of developing, evaluating, and selecting an effective remedial alternative in regards to Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC).</p> <p>Case 1: <i>If any of the MMR areas have a RAC score of 1 through 4 and range type selections includes more than Air-to-Air Range or explosive contaminated soil, then add the following:</i> The MEC Site Characterization and Removal Assessment Technology is included in this phase to investigate the nature and extent of MEC that is indicated to be present by the FUDSMIS MMR Area data.</p> <p>Case 2: <i>If any MMR area range type includes burial pits, guided missiles, hand grenades, OB/OD, Small Arms, Recreational Skeet, Explosive-contaminated soil or rifle grenade/anti-tank rocket, then add the following:</i> The RI, FS, and Groundwater Monitoring Wells technologies included in this phase are for investigating the nature and extent of MC contamination at projects where the FUDSMIS data from MMR areas lists a historical use of burial pits, guided missiles, hand grenades, OB/OD, Small Arms, Explosive-contaminated soil or rifle grenade/anti-tank rocket. These historical uses produce a potential source for MC contamination.</p>
Media/Waste Type	<p>Case 1: If any of the MMR areas have a RAC score of 1 through 4 and range type selections includes more than Air-to-Air Range or Explosive Contaminated soil, then: Media/Waste Type = Ordnance (not residual)</p> <p>Case 2: If the above conditions are not met and the range types</p>

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
	included in the MMR data include burial pits, guided missiles, hand grenades, OB/OD, Small Arms, recreational skeet, Explosive-contaminated soil or rifle grenade/anti-tank rocket, then: Media/Waste Type = Soil
Secondary Media/Waste Type	<p>Case 1: If the primary Media/Waste Type is Ordnance (not residual) and any range type includes burial pits, guided missiles, hand grenades, OB/OD, Small Arms, Recreational Skeet, Explosive-contaminated soil or rifle grenade/anti-tank rocket, then: Secondary Media/Waste Type = Soil</p> <p>Case 2: Otherwise: Secondary Media/Waste Type = None</p>
Contaminant	<p>Case 1: If any of the MMR areas have a RAC score of 1 through 4 and range type selections includes more than Air-to-Air Range or explosive contaminated soil, then: Contaminant = Ordnance (not residual)</p> <p>Case 2: If the above conditions are not met and the range types included in the MMR data include burial pits, guided missiles, hand grenades, OB/OD, Small Arms, recreational skeet, Explosive-contaminated soil or rifle grenade/anti-tank rocket then: Contaminant = Ordnance (residual)</p>
Secondary Contaminant	<p>Case 1: If primary Contaminant is Ordnance (not residual) and any range type includes burial pits, guided missiles, hand grenades, OB/OD, Small Arms, Explosive-contaminated soil or rifle grenade/anti-tank rocket Secondary contaminant, then: Secondary Contaminant = Ordnance (residual)</p> <p>Case 2: Otherwise: Secondary Contaminant = None</p>
Approach	None
Phase Start Date	<Project.StartYear> plus 1 year
Labor Rate Group	System Defaults
Analysis Rate Group	System Defaults

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
Markup Template	V7- FUDS PA, SI, RI/FS, EE/CA Phase Template
Technology Markups	System Defaults

5.2.1 MEC Site Characterization and Removal Assessment

The RI/FS phase costs will be estimated using several technologies in *RACER*. The MEC Site Characterization and Removal Assessment technology will be included in the RI/FS phase only if the following three conditions are all satisfied:

- One or more of the MMR areas has a RAC score of 1 through 4.
- The project acreage is greater than zero.
- The range type selections include more than Air-to-Air Range or Explosive Contaminated Soil.

The data input rules and assumptions for the MEC Site Characterization and Removal Assessment technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.2.1.1 System Definition Tab

Table 18 – Data Entry Rules for the System Definition Tab in the MEC Site Characterization and Removal Assessment Technology

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Scoping/Management = Selected
	Site Planning = Selected
	Site Characterization = Selected
	Alternative Analysis and Reporting = Selected
Characterization Area	Case 1: Total Project Acreage <project acreage>. Case 2: If the Total project Acreage is greater than 1 million acres, use the Sampling Acres instead. Case 3: If the Total Project Acreage is less than 1 acre but greater than zero acre, use 1 Acre instead.
Sampling Area	Case 1 from above: Calculated by the RACER technology based

Parameter	Data Entry Rules and Assumptions
	<p>on Characterization Area input on System Definition Tab.</p> <p>Case 2: $Y = (1.7427) * ((\text{<property.totalpropertyarea>} ^{-0.5881}))$ The lower limit for Y is 0.0025 and the upper limit is 0.6.</p> <p>Case 3: Calculated by the RACER technology based on Characterization Area input on System Definition Tab.</p>
Topography	<p>Select topography based on the weighted average of the topography values of the MMR areas from FUDSMIS.</p> <p>Case 1: If the weighted average is Water, use Mountainous as the Topography type.</p> <p>Case 2: If topography is null, use Gently Rolling as the Topography type. See Table 19.</p>
Vegetation	<p>Select vegetation based on the weighted average of the vegetation values of the MMR areas from FUDSMIS.</p> <p>Case 1: If the weighted average is Water, use Barren or Low Grass as the Vegetation type.</p> <p>Case 2: If Vegetation is null, use Low Grass and Few Shrubs as the Vegetation type. See Table 20.</p>
Site Complexity	Complexity Selection based on Table 23.
Range Types	<p>Combination of historic range uses from MMR Areas. Range Types selected are based on all Historic Use selected in FUDSMIS for all the MMR Areas associated with the project.</p> <p>Case 1: Table 21 shows the crosswalk between the FUDSMIS Area table field names and the RACER field names for each range type.</p>

Parameter	Data Entry Rules and Assumptions
	<p>Case 2: If no range type is selected in FUDSMIS, then "Other" will be selected as the <i>RACER</i> range type.</p>
Ordnance Types	<p>Combination of munitions types from MMR Areas.</p> <p>Case 1: Ordnance Types selected are based on all Munitions Types selected for all MMR Areas associated with the MMRP project in FUDSMIS. Table 22 shows the crosswalk between the FUDSMIS Area table field names and the <i>RACER</i> field names.</p> <p>Case 2: If no ordnance type is selected in FUDSMIS, then "Other" will be selected as the <i>RACER</i> ordnance type.</p>

Table 19 - FUDSMIS Topography and Corresponding *RACER* Topography

FUDSMIS Corresponding Number	FUDSMIS Topography	<i>RACER</i> Topography Type
1	Flat	Flat
2	Gently Rolling	Gently Rolling
3	Heavily Rolling	Heavily Rolling
4	Flat with Gorges or Gullies	Flat with Gorges or Gullies
5	Rolling with Gorges or Gullies	Rolling with Gorges or Gullies
6	Mountainous	Mountainous
7	Water	Mountainous

Table 20 - FUDSMIS Vegetation and Corresponding *RACER* Vegetation

FUDSMIS Corresponding Number	FUDSMIS Vegetation	<i>RACER</i> Vegetation Type
1	Barren or Low Grass	Barren or Low Grass

FUDSMIS Corresponding Number	FUDSMIS Vegetation	RACER Vegetation Type
2	Low Grass and Few Shrubs	Low Grass and Few Shrubs
3	Heavy Grass with Numerous Shrubs	Heavy Grass with Numerous Shrubs
4	Shrubs with Some Trees	Shrubs with Some Trees
5	Heavy Shrubs with Trees	Heavy Shrubs with Trees
6	Forest (Heavily Wooded)	Heavy Shrubs with Trees
7	Water	Barren or Low Grass

Table 21 - FUDSMIS Former Uses and Corresponding *RACER* Range Types

FUDSMIS Former Use	<i>RACER</i> Range Type
Air2Air	Air to Air
Air2Ground	Air to Ground
Artillery	Artillery
Bombing	Bombing Range
Buffer Area	Other
Burial Pit	Burial Pit
Explosive Contaminated Soil	Other
More than 3 Former Uses	Other
Guided Missiles	Guided Missile
Hand Grenade	Hand Grenade
Mortar	Mortar
Multiple/Combined Use	Multiple/ Combination
OBOD	OB/OD
Other	Other
R&D	Other
RCRA Disposal	Other
Recreational Skeet	Small Arms
Rifle Grenade, Anti-Tank Rocket	Rifle Grenade, Anti Tank
Small Arms	Small Arms
Training Area/Maneuver Area	Other

Table 22 - FUDSMIS Munitions Types and Corresponding *RACER* Ordnance Types

FUDSMIS Field Name	<i>RACER</i> Ordnance Type
Small Arms (expended)	Small Arms
Small Arms (complete rounds)	Small Arms
Hand Grenades, Live	Hand Grenades, Live
Hand Grenades (Incendiary, Smoke)	Hand Grenades, Live
Hand Grenades (WP)	Hand Grenades, Live
Hand Grenades (Practice)	Hand Grenades, Practice
Bombs, High Explosive	Bomb, High Explosive
Bombs (Incendiary, Photoflash)	Bombs, WP Incendiary, photoflash
Bombs (WP)	Bombs, WP Incendiary, photoflash
Bombs, Practice	Bombs, Practice
Ground Rockets, Live	Ground Rockets, Rifle Grenades, Live
Rifle Grenades, Live	Ground Rockets, Rifle Grenades, Live
Ground Rockets, Rifle Grenades (Incendiary, Smoke)	Ground Rockets, Rifle Grenades, Live
Ground Rockets, Rifle Grenades (WP)	Ground Rockets, Rifle Grenades, Live
Ground Rockets, Rifle Grenades, Practice	Ground Rockets, Rifle Grenades, Practice
Medium caliber (20, 25, 30mm), HE	Medium Caliber (20mm, 25mm, 30mm)
Medium caliber (20, 25, 30 mm), Practice	Medium Caliber (20mm, 25mm, 30mm)
Large caliber (37mm and larger), HE	Large caliber (37 mm and larger)
Large caliber (37mm and larger), (Incendiary, Smoke)	Large caliber (37 mm and larger)
Large caliber (37mm and larger) (WP)	Large caliber (37 mm and larger)
Large caliber (37mm and larger), Practice	Large caliber (37 mm and larger)
Mortars, HE	Mortars
Mortars, (Incendiary, Illumination, Smoke)	Mortars
Mortars (WP)	Mortars
Mortars, Practice	Mortars

FUDSMIS Field Name	<i>RACER</i> Ordnance Type
Aerial Rockets (Live)	Aerial Rockets (Live)
Aerial Rockets (WP_	Aerial Rockets (Live)
Aerial Rockets (Practice)	Aerial Rockets, Practice
Guided Missiles, Ground	Guided Missiles
Guided Missiles, Aerial	Guided Missiles
Landmines, Anti-Personnel	Land Mines
Landmines, Anti-Tank	Land Mines
Landmines, Practice (with spotting charges)	Land Mines
Pyrotechnics	Pyrotechnics
Flares, signals, simulators or screening smoke (other than white phosphorus)	Other
Riot Control Agents	Other
Demolition Materials	Demolition Materials
Detonators	Demolition Materials
Blasting Caps	Demolition Materials
Fuses, Boosters, or Bursters	Demolition Materials
Primary or Initiating Explosives	Other
Secondary Explosives (PETN, Comp A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	Other
Military Dynamite	Demolition Materials
Less Sensitive Explosives (Ammonium Nitrate, Explosive D, etc.)	Other
Propellants (Solid, Liquid)	Other
Practice Ordnance (without spotting charges)	Other
Torpedoes/Sea Mines	Guided Missiles
Gas ID Sets	Other
Toxic Chemical Munitions	Other
Radiological Munitions	Other
Experimental	Other
Biological Munitions	Other
Other	Other

Table 23 - Complexity for MEC Models using Topography and Vegetation Types

Vegetation\Topography	Flat	Gently Rolling	Heavy Rolling	Flat with gorges or gullies	Rolling with gorges or gullies	Mountains
Barren or Low Grass	Low	Low	Low	Low	Medium	High
Low Grass and Few Shrubs	Low	Low	Low	Medium	Medium	High
Heavy Grass with Numerous Shrubs	Low	Low	Medium	Medium	High	High
Shrubs with some Trees	Low	Medium	Medium	High	High	High
Heavy Shrubs with Trees	Medium	Medium	Medium	High	High	High

5.2.1.2 Scoping/Management Tab

Table 24 – Data Entry Rules for the Scoping/Mgmt Tab in the MEC Site Characterization and Removal Assessment Technology

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Site Visit = Selected
	Work Plan = Selected
	Reconnaissance & Site Prioritization Plan = Selected
	Overall Project Management/Meetings = Selected

5.2.1.3 Site Planning Tab

Table 25 – Data Entry Rules for the Site Planning Tab in the MEC Site Characterization and Removal Assessment Technology

Parameter	Data Entry Rules and Assumptions
Surveying Area	Calculated by the RACER technology based on Sampling Area calculated on the System Definition Tab.
Number of Grids	Calculated by the RACER technology based on Sampling Area calculated on the System Definition Tab.
Surveying Method	GPS Surveying with Automated Recording and Mapping System = Selected
	Hand Held GPS Units = Not Selected

Parameter	Data Entry Rules and Assumptions
	Conventional Surveying = Not Selected
Vegetation Removal	Heavy Removal = Calculated by the RACER technology based on Vegetation Selected and Sampling Area Calculated on the System Definition Tab.
	Moderate Removal = Calculated by the RACER technology based on Vegetation Selected and Sampling Area Calculated on the System Definition Tab.
	Light Removal = Calculated by the RACER technology based on Vegetation Selected and Sampling Area Calculated on the System Definition Tab.
	No Removal = Calculated by the RACER technology based on Vegetation Selected and Sampling Area Calculated on the System Definition Tab.
Establishment and Management of GIS	Selected
Geophysical Prove-Out	Selected
Include Per Diem for UXO Escort	Selected

5.2.1.4 Site Characterization Tab

Table 26 – Data Entry Rules for the Site Characterization Tab in the MEC Site Characterization and Removal Assessment Technology

Parameter	Data Entry Rules and Assumptions
Geophysics	Area = Calculated by the RACER technology based on Sampling Area calculated on the System Definition Tab.
	Number of Teams = Calculated by the RACER technology based on Sampling Area calculated on the System Definition Tab.
	Duration = Calculated by the RACER technology based on selections made on the System Definition Tab.
	Navigational Tool = Satellite
	Towed Array = Calculated by the RACER technology based on selections made on the System Definition Tab
Surface Clearance	Area = Calculated by the RACER technology based on Sampling Area calculated on the System Definition Tab
	Number of Teams = Calculated by the RACER technology based on Sampling Area calculated on the System Definition Tab
	Duration = Calculated by the RACER technology based on selections made on the System Definition Tab
Mag & Flag	Area = 0
	Number of Teams = 0
	Duration = 0
	Ordnance Locator = Schonstedt Model GA-72CV
Intrusive Investigations	Area = Calculated by the RACER technology based on Sampling Area calculated on the System Definition Tab
	Anomalies per Acre = Calculated by the RACER technology based on selections made on the System Definition Tab
	Percent Scrap = Technology Default

Parameter	Data Entry Rules and Assumptions
	Number of Teams = Calculated by the RACER technology based on Sampling Area calculated on the System Definition Tab
	Duration = Calculated by the RACER technology based on selections made on the System Definition Tab
Archeological Survey	Selected
Flora/Fauna Survey	Selected

5.2.1.5 Alternative Analysis/Reporting Tab

Table 27 – Data Entry Rules for the Alternative Analysis/Reporting Tab in the MEC Site Characterization and Removal Assessment Technology

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Risk Evaluation = Selected
	Institutional Analysis = Selected
	Assessment Report = Selected
	Action Memorandum = Selected
	Community Relations Support = Selected

5.2.1.6 Comments Tab

The following text will be entered onto the Comments tab in the MEC Site Characterization and Removal Assessment technology:

The tasks selected are to determine the nature and extent of MEC for this project. The required parameter, characterization acres, is based on the total project acreage. The FUDSMIS <INSERT DATE of Data Set> data field for Total Property Area determines the total project acreage unless the property has more than one project requiring an estimate. In that case, total project acreage is the sum of all MMR Areas, Land Acres, plus up to 50 Inland Acres for each area, plus up to 50 Tidal Acres for each area for this project. In addition, the Total Project Acreage is limited to 100,000 acres if the historical use of maneuver area is selected in any of the MMR areas.

If the total project acreage is over 1 million acres, the characterization acreage is determined using the formula from the RACER 2005 calculation for sampling acreage and entered as both the characterization acreage and the sampling acreage. Therefore the default sampling acreage is modified.

If the total project acreage is less than 1 acre but greater than zero acres, the characterization acreage is entered as 1.

The required parameters for Range, Ordnance, Topography, and Vegetation types are determined from the data elements from the MMR Range Inventory Area Data for this project. Please reference the document, "Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects" for more specific information of how the MMR data is transformed for inputs for this technology.

5.2.2 Remedial Investigation

The RI/FS phase costs will be estimated using several technologies in *RACER*. The Remedial Investigation technology will be included in the RI/FS phase only if the following conditions are all satisfied:

- When one or more MMR area in the project has the following former uses:
 - Burial pits
 - Guided missiles
 - Hand grenades
 - OB/OD
 - Small arms
 - Recreational skeet
 - Explosive-contaminated soil
 - Rifle grenade/anti-tank rocket

The data input rules and assumptions for the Remedial Investigation technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.2.2.1 System Definition Tab

Table 28 – Data Entry Rules for the System Definition Tab in the Remedial Investigation Technology

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Scoping = Selected
	Site Characterization = Selected
	Install Groundwater Monitoring Wells Case 1: Select Install Groundwater Monitoring Wells unless the former use includes only small arms or recreational skeet and the depth to groundwater is over 100 feet.

Parameter	Data Entry Rules and Assumptions
	Sampling and Analysis (S&A) = Selected
	Other Investigations = Not Selected
Site Distance	250 miles
Site Complexity	Moderate

5.2.2.2 Scoping Tab

Table 29 – Data Entry Rules for the Scoping Tab in the Remedial Investigation Technology

Parameter	Data Entry Rules and Assumptions
Tasks to Include	RI Work Plan = Selected
	Data Quality Objectives = Selected
	Preliminary Alternatives = Selected
	Community Relations Activities = Case 1: Estimate includes MEC Site Characterization and Removal Assessment = Not Selected Case 2: Estimate does not include MEC Site Characterization and Removal Assessment = Selected
	RI Supplemental Plans (HASP, FSP, QAPP) = Selected

5.2.2.3 Site Characterization Tab

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Table 30 – Data Entry Rules for the Site Characterization Tab in the Remedial Investigation Technology

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Fieldwork Support = Selected
	Evaluate Site Geology/Hydrogeology = Selected
	Evaluate Site Soils/Surface Hydrology = Selected
	Evaluate Site Meteorology = Selected
	Evaluate Populations and Land Usage = Selected
	Evaluate Site Ecology = Selected
	Evaluate Nature and Extent of Contamination = Selected

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Parameter	Data Entry Rules and Assumptions
	Evaluate Containment Fate and Transport = Selected
	Conduct Baseline Risk Assessment = Selected
	Compose RI Report = Selected

5.2.2.4 S&A Tab

Table 31 – Data Entry Rules for the S&A Tab in the Remedial Investigation Technology

Parameter	Data Entry Rules and Assumptions
Sampling – Bioassays	Bioassays = Not Selected
Crew Size	2 Field Technicians
Safety Level	E
Include QA/QC Samples	Selected
Sampling – Water	Groundwater = Selected Case 1: If the former use is small arms or recreational skeet only and the depth to groundwater is over 100 feet = Not Selected
	Surface Water = Not Selected
Water Analytical Template	Primary Case 1: Primary: System Water – Ordnance Residual (Modified)
	Case 2: If groundwater is not selected: None Secondary: None
Sampling Soil/Sediment	Surface Soil = Selected
	Subsurface Soil = Selected
	Sediment = Not Selected
Soil Analytical Template	Primary: Case 1: If the former uses include ONLY small arms or recreational skeet, AND the only ordnance type for any MMR area is small arms (expended) or small arms (complete) Primary: FUDS – MC Soil
	Case 2: Otherwise: Primary: System Soil – Ordnance Residual (Modified)
	Secondary: None
Sampling – Air/Soil Gas	Air = Not Selected
	Soil Gas = Not Selected

Parameter	Data Entry Rules and Assumptions
Air/Gas Analytical Template	Primary = None
	Secondary = None

5.2.2.5 Media Tab

Table 32 – Data Entry Rules for the Media Tab in the Remedial Investigation Technology

Parameter	Data Entry Rules and Assumptions
Groundwater Aquifer 1 – Average Sample Depth (FT)	<p>Case 1: Depth To Groundwater <Area.DepthToGroundwater>, if null or zero, set to 50ft.</p> <p>Case 2: Use the maximum value of the areas that meet the criteria for this technology.</p>
Groundwater Aquifer 1 – # of Sampling Locations	For each MMR area with a former use of burial pits, guided missiles, hand grenades, OB/OD, explosive-contaminated soil, small arms, recreational skeet, or rifle grenade/anti-tank rocket include four (4) sample locations.
Groundwater Aquifer 1 – # of Samples per Location	1 (One) per Location
Groundwater Aquifer 1 – # of Rounds	2 (Two) per Location
Surface Water	N/A
Surface Soil – # of Sampling Locations	The total number of sampling locations is equal to the sum of the number of sampling locations for each former use within each MMR area as indicated in Table 33. Sampling Locations for RI/FS. The number of sampling locations is based on typical size of these type ranges.
Surface Soil – # of Samples per Location	1 (One) per Location
Surface Soil – # of Rounds	1 (One) per Location
Subsurface Soil – Average Sample Depth (FT)	2 (Two) feet

Parameter	Data Entry Rules and Assumptions
Subsurface Soil – # of Sampling Locations	The total number of sampling locations is equal to the sum of the number of sampling locations for each former use within each MMR area as indicated in Table 33. Sampling Locations for RI/FS. The number of sampling locations is based on typical size of these type ranges.
Subsurface Soil – # of Samples per Location	1 (One) per location
Subsurface Soil – # of Rounds	1 (One) per location

Table 33 Sampling Locations for RI/FS

FUDSMIS Field Name Former Use/Range Type	Number of Sampling Locations
Burial Pit	10
Guided Missiles	30
Hand Grenade	10
OBOD	10
Rifle Grenade, Anti-Tank Rocket	10
Small Arms, Skeet	10
Explosive Contaminated Soil	10
Air to Ground	0
Artillery	0
Bombing range	0
Buffer	0
Mortar	0
Multi Combined Use	0
Other	0
RD	0
RCRA Disposal	0
Training Maneuver Area	0

5.2.2.6 Methodology Tab

Table 34 – Data Entry Rules for the Methodology Tab in the Remedial Investigation Technology

Parameter	Data Entry Rules and Assumptions
Groundwater	Wells-Pumps
Subsurface Soil	Hand Auger
Soil Gas	N/A
Surface Water	N/A
Number of Wells Sampled/Day	6
Drum Purge Water	Not Selected
Laboratory Configuration	Conventional = Selected
	Mobile = Not Selected
	On-site Duration = N/A
Turn Around Time	Standard
Quality Control	Level 3

5.2.2.7 Comments Tab

The following text will be entered onto the Comments tab in the Remedial Investigation technology:

This technology addresses costs for conducting a Remedial Investigation (RI) that addresses potential liabilities due to Munitions Constituents (MC) when one or more MMR areas in the project has the following historical uses:

Burial Pits
Guided Missiles
Hand Grenades
OB/OD
Small Arms
Recreational Skeet
Explosive-Contaminated Soil
Rifle Grenade/Anti-Tank Rocket

Input parameters and assumptions used in estimating costs for the RI are as follows:

Groundwater Monitoring Wells are selected except for the case when the depth to groundwater is over 100 ft and the only historical use is Small Arms or Recreational Skeet.

Other Investigations is not selected for the RI technology. It is assumed that the only other type of investigation would be for Munitions and Explosives of Concern (MEC), which is covered under the MEC Site Characterization and Removal Assessment Technology, if present. For estimating purposes, an assumption of 250 miles was used as the average distance to the project location.

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The moderate complexity was chosen as the site complexity due to the information available in the help system of *RACER*.

The number of sampling locations and analytical templates are determined by the historical use of each MMR area. Reference the document, "Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects" for more specific information of how the MMR data is transformed for inputs for this technology.

One (1) surface soil sample and One (1) subsurface soil sample to a depth of two (2) feet are anticipated for each sample location.

For estimating purposes, the purge water from the groundwater testing is assumed to not contain MC, and therefore, it will not be drummed.

Case 1:

Add comment only if the MEC Site Characterization and Removal Assessment Technology is used:

The Community Relations Activities task is not selected because this work will be included as part of the MEC Site Characterization and Removal Assessment.

5.2.3 Feasibility Study

The RI/FS phase costs will be estimated using several technologies in *RACER*. The Feasibility Study (FS) technology will be included in the RI/FS phase only if the following conditions are all satisfied:

- When one or more MMR area in the project has the following former uses:
 - Burial pits
 - Guided missiles
 - Hand grenades
 - OB/OD
 - Small arms
 - Recreational skeet
 - Explosive-contaminated soil
 - Rifle grenade/anti-tank rocket

The data input rules and assumptions for the FS technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.2.3.1 System Definition Tab

**Table 35 – Data Entry Rules for the System Definition Tab
in the Feasibility Study Technology**

Parameter	Data Entry Rules and Assumptions
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Parameter	Data Entry Rules and Assumptions
Tasks to Include	Scoping = Selected Development/Screening of Alternatives = Selected Analysis of Alternatives = Selected Remedy Selection = Selected
Site Complexity	Moderate
Level of Study Detail	Limited
Level of Study Documentation	Limited

5.2.3.2 Scoping Tab

**Table 36 – Data Entry Rules for the Scoping Tab
in the Feasibility Study Technology**

Parameter	Data Entry Rules and Assumptions
Select the Following Tasks	RI Review = Selected (f not prepared by FS Contractor). FS Work Plan = Selected Data Quality Objectives = Selected Primary Alternatives = Selected Case 1: Estimate includes MEC Site Characterization and Removal Assessment: Community Relations: = Not Selected Case 2: Estimate does not include MEC Site Characterization and Removal Assessment: Community Relations: = Selected

5.2.3.3 Development Tab

**Table 37 – Data Entry Rules for the Development Tab
in the Feasibility Study Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Identify/Evaluate Treatment Technologies = Selected Assemble Technologies into Alternatives = Selected Identify Action-Specific ARARs = Selected Screen Alternatives = Selected Evaluate Action-Specific ARARs = Selected

5.2.3.4 Analysis Tab

**Table 38 – Data Entry Rules for the Analysis Tab
in the Feasibility Study Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Evaluate Alternatives by Nine Criteria = Selected Compose Draft FS Report = Selected Further Develop Preferred Alternative = Selected Case 1: Estimate includes MEC Site Characterization and Removal Assessment: Implement Community Relations = Not Selected Public Meetings/Prepare Transcript = Not Selected Case 2: Estimate does not include MEC Site Characterization and Removal Assessment: Implement Community Relations = Selected Public Meetings/Prepare Transcript = Selected

5.2.3.5 Remedy Selection Tab

**Table 39 – Data Entry Rules for the Remedy Selection Tab
in the Feasibility Study Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Compose Final FS Report = Selected Update Administrative Record = Selected Case 1: Estimate includes MEC Site Characterization and Removal Assessment: Prepare ROD/Decision Document/Proposed Plan = Not Selected Case 2: Estimate does not include MEC Site Characterization and Removal Assessment: Prepare ROD/Decision Document/Proposed Plan = Selected

5.2.3.6 Comments Tab

The following text will be entered onto the Comments tab in the Feasibility Study technology:

This technology addresses costs for performing a Feasibility Study (FS) that addresses potential liabilities due to Munitions Constituents (MC). Input parameters and assumptions used in estimating costs for this technology are as follows:

Case 1:

If Estimate includes MEC Site Characterization and Removal Assessment:

All tasks are selected with a moderate complexity chosen to account for studying MC at Military Munitions Response (MMR) areas that include burial pits, guided missiles, hand grenades, OB/OD, small arms, recreational skeet, explosives contaminated soil or rifle grenade/anti-tank rocket as historical uses. The Community Relations Activities, Implement Community Relations, Public Meetings/Prepare Transcript, and Prepare ROD/Decision Document/Propose Plan tasks that are part of the FS technology are not selected due to the cost being accounted for in the Munitions and Explosives of Concern (MEC) Site Characterization and Removal Assessment Technology. For estimating purposes, an assumption of 250 miles was used as the average distance to the project location.

Case 2:

If Estimate DOES NOT include MEC Site Characterization and Removal Assessment:

All tasks are selected with a moderate complexity chosen to account for studying MC at Military Munitions Response (MMR) areas that include burial pits, guided missiles, hand grenades, OB/OD, small arms, recreational skeet, explosives contaminated soil or rifle grenade/anti-tank rocket as historical uses. For estimating purposes, an assumption of 250 miles was used as the average distance to the project location.

5.2.4 Groundwater Monitoring Well

The RI/FS phase costs will be estimated using several technologies in *RACER*. The Groundwater Monitoring Well (GMW) technology will be included in the RI/FS phase only if the following conditions are all satisfied:

- When one or more MMR area in the project has one or more of the following former uses:
 - Burial pits
 - Guided missiles
 - Hand grenades
 - OB/OD
 - Small arms
 - Recreational skeet
 - Explosive-contaminated soil
 - Rifle grenade/anti-tank rocket
- If the former use includes only small arms or recreational skeet, this technology will be included only if the depth to groundwater is 100 feet or less. If the depth to groundwater in the FUDSMIS input file is null, the depth to groundwater will be assumed to be 50 feet.

The data input rules and assumptions for the GMW technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.2.4.1 System Definition Tab

**Table 40 – Data Entry Rules for the System Definition Tab
in the Groundwater Monitoring Wells Technology**

Parameter	Data Entry Rules and Assumptions
Number of Aquifers	One (1)
Include Guard Posts	No
Safety Level	E
Depth to Groundwater	Depth to Groundwater, <Area.DepthToGroundwater>, if null or zero equal to 50
Number of Wells:	For each MMR area with a former use of burial pits, guided missiles, hand grenades, OB/OD, explosives contaminated soil, rifle grenade/anti-tank rocket, recreational skeet or small arms include four (4) wells. Case 1: If depth to groundwater is greater than 100 feet, do not include small arms or recreational skeet in the cumulative number of wells.

5.2.4.2 Aquifer One Tab

**Table 41 – Data Entry Rules for the Aquifer One Tab
in the Groundwater Monitoring Wells Technology**

Parameter	Data Entry Rules and Assumptions
Average Well Depth	Area.DepthToGroundwater plus 10, if <area.depthtogrouproundwater> is null or zero use 60 ft.
Formation Type	Unconsolidated
Split Spoon Sample Collection	Selected
Drum Drill Cuttings	Not Selected
Safety Level:	Level E
Well Diameter:	2 inch
Drilling Method:	Hollow Stem
Well Construction Material:	PVC Schedule 40
Average Number of Soil Samples	1 (One)

Parameter	Data Entry Rules and Assumptions
per well:	
Soil Analytical Template	<p>Case 1: If the former uses includes only recreational skeet or small arms AND small arms (expended) or small arms (complete) is the only ordnance type for any MMR area: Soil Analytical Template: FUDS – MC Soil</p> <p>Case 2: Soil Analytical Template: System Soil – Ordnance Residual (Modified)</p>

5.2.4.3 Comments Tab

The following text will be entered onto the Comments tab in the Groundwater Monitoring Wells technology:

This technology addresses costs for installing groundwater-monitoring wells as part of the Remedial Investigation (RI) that addresses potential liabilities due to Munitions Constituents (MC). Groundwater monitoring wells will be installed to determine the nature and extent of groundwater contamination at Military Munitions Response (MMR) areas with the historical use of burial pits, guided missiles, hand grenades, OB/OD, explosives contaminated soil, rifle grenade/anti-tank rocket, small arms or recreational skeet. The number of wells and the depth of the well along with the rest of the parameters are determined by the project MMR Area data and engineering judgment. Reference the document, “Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects” for more specific information of how the MMR data is transformed for inputs for this technology.

5.3 Remedial Design (RD) Phase

The RD phase will be included for all MMRP projects requiring CTC estimates that include a RA-C for MEC phase. The RD phase will be set up using the Design (Detail Method) phase type in *RACER*. The data entry rules and assumptions for an RD phase are presented in Table 42.

Table 42 – Data Entry Rules for the Remedial Design Phase Screen

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
Phase Name	RD
Description (Text)	The costs included in the Remedial Design (RD) phase are for the contract and design costs for future phases.
Phase Start Date	Project.StartYear + 2 years
Phase Elements Included	RA-C for MEC

	RA-C for MC
RD Cost Calculations	<p>Case 1: RA-C for MEC Approach = Ordnance and Residual Waste Cost = \$50,000</p> <p>Case 2: RA-C for MC Approach = Ex Situ Removal - Off-site Treatment or Disposal Cost = Percent from <i>RACER</i> table based on cost of RA-C for MC phase</p>

5.4 RA-C for MEC Phase

The RA-C for MEC phase will be included for all MMRP projects requiring CTC estimates that meet all of the following conditions.

- The project includes the RI/FS phase.
- One or more of the MMR areas has a RAC score of 1 to 4.
- At least one former use is other than Air-to-Air or Explosive Contaminated Soil.
- The Project Area is not null or zero.

The RA-C for MEC phase will be set up using the Remedial Action phase type in *RACER*. The data entry rules and assumptions for an RA-C for MEC phase are presented in Table 43.

Table 43 – Data Entry Rules for the RA-C Phase for MEC

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
Phase Name	RA-C for MEC
Description	<p>The Remedial Action – Construction (RA-C) phase for Munitions and Explosive of Concern (MEC) addresses costs associated with implementing a remedy for the MEC portion of the project. This remedy is determined by using the FUDSMIS data <INSERT DATE> for the property and project MMR area data elements and the document, “Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects”.</p> <p>The remedy includes a removal action and institutional controls for any Military Munitions Response (MMR) areas with a Risk Assessment Code (RAC) score between 1 and 4 and the historical use includes selections other than Air-to-Air or Explosive Contaminated soil. In addition, the MEC Sifting technology will be included if the historic use includes an Open Burn/Open Detonation area.</p>
Media/Waste Type	Ordnance (not residual)
Secondary Media/Waste Type	None
Contaminant	Ordnance (not residual)
Secondary Contaminant	None
Approach	Ordnance Removal

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
Phase Start Date	<Project.StartYear> plus 3 years
Labor Rate Group	System Defaults
Analysis Rate Group	System Defaults
Markup Template	V7 – FUDS RD, RmD, RA-C, RmA-C, IRA, RA-O Phase Template
Technology Markups	System Defaults

5.4.1 MEC Institutional Controls

The RA-C for MEC phase costs will be estimated using several technologies in *RACER*. The MEC Institutional Controls technology will be included in the RA-C for MEC phase only if one or more of the MMR areas associated with the project have a RAC score of 1 through 4.

The data input rules and assumptions for the MEC Institutional Controls technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.4.1.1 System Definition Tab

**Table 44 – Data Entry Rules for the System Definition Tab
in the MEC Institutional Controls Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Planning = Selected Implementation = Selected Engineering Controls = Not Selected Training and Follow Up = Selected Quality Support Visits = Selected
Site Distance (miles One-way)	250
Site Complexity	Moderate

5.4.1.2 Planning Tab

**Table 45 – Data Entry Rules for the Planning Tab
in the MEC Institutional Controls Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Institutional Analysis = Selected Plan Development = Selected

5.4.1.3 Implementation Tab

**Table 46 – Data Entry Rules for the Implementation Tab
in the MEC Institutional Controls Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Process Agreement = Selected Plan Execution = Selected Deed Notice = Selected

5.4.1.4 Training & Follow-up Tab

**Table 47 – Data Entry Rules for the Training & Follow-up Tab
in the MEC Institutional Controls Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Initial Training = Selected Refresher Training = Selected

5.4.1.5 Comments Tab

The following text will be entered onto the Comments tab in the MEC Institutional Controls technology:

This technology addresses costs for planning and implementing Institutional Controls as part of the Remedial Action-Construction (RA-C) for Munitions and Explosives of Concern (MEC). The MEC Institutional controls are for estimating the cost for implementing such tasks as public involvement and educational awareness during the Remedial Action phase of the project. Examples of institutional controls include educational brochures and pamphlets, warning signs, and public announcements. Engineering Controls are not selected as an appropriate task under the institutional controls because this implies that engineering controls are fencing and other costs associated with fencing areas. This type of engineering control is not expected at Formerly Used Defense Sites. For

estimating purposes, an assumption of 250 miles was used as the average distance to the project location.

5.4.2 MEC Removal Action

The RA-C for MEC phase costs will be estimated using several technologies in *RACER*. The MEC Removal Action technology will be included in the RA-C for MEC phase only if the conditions specified below are met:

- One or more of the MMR areas associated with the project have a RAC score of 1 through 4 AND,
- The historic use includes selections other than Air to Air or Explosives Contaminated Soil, OR
- The ordnance type is not small arms (expended) only.

The data input rules and assumptions for the MEC Removal Action technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.4.2.1 System Definition Tab

**Table 48 – Data Entry Rules for the System Definition Tab
in the MEC Removal Action Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Site Visit = Selected Survey = Selected Case 1: Vegetation Removal = Selected Case 2: When the weighted average of the MMR areas vegetation or topography type is equal to water; therefore, when vegetation or topography is equal to water: Vegetation Removal = Not Selected UXO Mapping = Selected UXO Removal = Selected Site Management = Selected Reporting and Stakeholder Involvement = Selected Case 3: If Removal Action is estimated more than once, the Site Visit Task and Reporting and Stakeholder Involvement Task will not be

Parameter	Data Entry Rules and Assumptions
	available for selection in the additional RA technologies.
Safety Level	E
Multiple Areas of Concern	<p>Case 1: Select "Multiple Areas of Concern" if the total removal acreage for the remedial action is greater than 100,000, necessitating running the technology more than once to remain within the valid range for the technology.</p> <p>Case 2 Not Selected</p>

5.4.2.2 Removal Area Tab

**Table 49 – Data Entry Rules for the Removal Area Tab
in the MEC Removal Action Technology**

Parameter	Data Entry Rules and Assumptions
Removal Area	$Y = (19.715) * ((\text{project area})) ^ (-0.6921))$ <p>Y is the percentage of the acreage where a removal action will be performed. The maximum value for Y = 75%. The minimum value for Y = 7% Removal Acreage= Y * (projectarea)</p>
Search Depth	4 feet (The current methodology used in MEC removal actions is to search to depth with no specific depth identified. Four feet is entered to ensure the search depth is reasonable.)
Topography:	<p>Select topography based on the weighted average of the topography values of the MMR areas from FUDSMIS.</p> <p>Case 1: If the weighted average is Water, use Mountainous as the Topography type.</p> <p>Case 2: If topography is null, use Gently Rolling as the Topography type. See Table 19.</p>
Vegetation	Select vegetation based on the weighted average of the vegetation values of the MMR areas from FUDSMIS.

Parameter	Data Entry Rules and Assumptions
	<p>Case 1: If the weighted average is Water, use Barren or Low Grass as the Vegetation type.</p> <p>Case 2: If Vegetation is null, use Low Grass and Few Shrubs as the Vegetation type. See Table 20.</p>
Range Types	<p>Case 1: Combination of historic range uses from MMR Areas. Range Types selected are based on all Historic Use selected in FUDSMIS for all the MMR Areas associated with the project. Table 21 shows the crosswalk between the FUDSMIS Area table field names and the <i>RACER</i> field names for each range type.</p> <p>Case 2: If no range type is selected in FUDSMIS, then "Other" will be selected as the <i>RACER</i> range type.</p>
Ordnance Type	<p>Case 1: Combination of munitions types from MMR Areas. Ordnance Types selected are based on all Munitions Types selected for all MMR Areas associated with the MMRP project in FUDSMIS. Table 22 shows the crosswalk between the FUDSMIS Area table field names and the <i>RACER</i> field names.</p> <p>Case 2: If no ordnance type is selected in FUDSMIS, then "Other" will be selected as the <i>RACER</i> ordnance type.</p>
Anomaly Density	Calculated by the <i>RACER</i> technology based on Range Type Selections on the System Definition Tab
Percent Scrap	99%
Total Anomalies	Calculated by the <i>RACER</i> technology based on Range Type Selections and Removal Area entered on System Definition Tab

5.4.2.3 Surveying Tab

**Table 50 – Data Entry Rules for the Surveying Tab
in the MEC Removal Action Technology**

Parameter	Data Entry Rules and Assumptions
Area	This field is populated based on the Removal Area value entered in the Removal Area tab.
Number of Grids	Calculated by the RACER technology based on Removal Area entered on the System Definition Tab.
Surveying Methods	GPS Surveying with Automated Recording and Mapping System = Selected Hand Held GPS Units = Not Selected Conventional Surveying = Not Selected
Include Per Diem for UXO Escort	Selected

5.4.2.4 Vegetation Removal Tab

**Table 51 – Data Entry Rules for the Vegetation Removal Tab
in the MEC Removal Action Technology**

Parameter	Data Entry Rules and Assumptions
Heavy Removal	Calculated by the RACER technology based on Removal Area input, and Vegetation Type selected in the Removal Area Tab.
Moderate Removal	Calculated by the RACER technology based on Removal Area input, and Vegetation Type selected in the Removal Area Tab.
Light Removal	Calculated by the RACER technology based on Removal Area input, and Vegetation Type selected in the Removal Area Tab.
No Removal	Calculated by the RACER technology based on Removal Area input, and Vegetation Type selected in the Removal Area Tab.

5.4.2.5 UXO Mapping Tab

**Table 52 – Data Entry Rules for the UXO Mapping Tab
in the MEC Removal Action Technology**

Parameter	Data Entry Rules and Assumptions
Geophysics	
Area	Calculated by the RACER technology based on Removal Area input in the Removal Area Tab.
Navigational Tool	Satellite
Number of Teams	Calculated by the RACER technology based on Removal Area input in the Removal Area Tab.
Towed Array	Calculated by the RACER technology based on Removal Area and Topography input in the Removal Area Tab.
Duration	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.
Mag & Flag	
Area	0
Number of Teams	0
Duration	0
Ordnance Locator	Schonstedt Model GA-72CV, hand held
Surface Clearance	
Area	Calculated by the RACER technology based on Removal Area input in the Removal Area Tab.
Number of Teams	Calculated by the RACER technology based on Removal Area input in the Removal Area Tab.
Duration	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.

5.4.2.6 UXO Removal Tab

**Table 53 – Data Entry Rules for the UXO Removal Tab
in the MEC Removal Action Technology**

Parameter	Data Entry Rules and Assumptions
Ordnance Destruction	
Electrical	30%
Non-electrical	0
In-grid Consolidation	70%
Operation Duration	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.
Number of Teams	Calculated by the RACER technology based on Removal Area input in the Removal Area Tab.
Number of Backhoes	Calculated by the RACER technology based on Removal Area and Search Depth input in the Removal Area Tab.
Explosive Requirements	
Explosives	TNT
Detonation Cord (1,000 FT Roll)	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.
Initiator	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.

5.4.2.7 Site Management Tab

**Table 54 – Data Entry Rules for the Site Management Tab
in the MEC Removal Action Technology**

Parameter	Data Entry Rules and Assumptions
Senior UXO Supervisor	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.
Project Manager	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.
UXO Supervisor	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.

Parameter	Data Entry Rules and Assumptions
Quality Control Supervisor	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.
Safety Supervisor	Calculated by the RACER technology based on Selections entered on the Removal Area Tab.

5.4.2.8 Reporting and Stakeholder Involvement Tab

Table 55 – Data Entry Rules for the Reporting and Stakeholder Involvement Tab in the MEC Removal Action Technology

Parameter	Data Entry Rules and Assumptions
Level of Detail Required in Reporting	Moderate
Level of Stakeholder Involvement	Moderate
Number of Community Meetings	2
Work Plan	Selected
Explosive Safety Submission	Selected

5.4.2.9 Comments Tab

The following text will be entered onto the Comments tab in the MEC Removal Action technology:

The Munitions and Explosives of Concern (MEC) Removal Action Technology is used to estimate the costs associated with removing MEC. Input parameters and assumptions used in estimating costs for this technology are as follows:

Actual data was collected from projects with removal actions that are completed or currently underway, this data was analyzed to create a formula for predicting the required removal area for future projects. For details about derivation of this formula, see Appendix A of the document titled "Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects".

The formula for determining the removal area is $100 * (19.715 * (\text{total project acreage}^{\wedge} - 0.6921))$ with an upper limit of 75% and lower limit of 7%.

The FUDSMIS <INSERT DATE of Data Set> data field for Total Property Acreage determines the total project acreage unless the property has more than one project requiring an estimate. In that case, total project acreage is the sum of all MMR Areas, Land Acres, plus up to 50 Inland Acres for each area, plus up to 50 Tidal Acres for each area for this project. In addition, the Total Project Acreage is limited to 100,000 acres if the historical use of maneuver area is selected in any of the MMR areas and is 1 acre if the Total Project Acreage is between 0 and 1

The required parameters for Range, Ordnance, Topography, and Vegetation Types are determined from the data elements from the MMR Range Inventory Area Data for this project. Please reference the document, "Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects" for more specific information of how the MMR data is transformed for inputs for this technology. All secondary parameter default values are used.

5.4.3 MEC Sifting

The MEC Sifting technology will be included in the RA-C for MEC phase only if all of the conditions specified below are met:

- One or more of the MMR areas associated with the project have a RAC score of 1 through 4.
- Former use includes OB/OD.
- MMR area has acres greater than zero.

The data input rules and assumptions for the MEC Sifting technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.4.3.1 System Definition Tab

**Table 56 – Data Entry Rules for the System Definition Tab
in the MEC Sifting Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include:	Site Visit = Selected Site Preparation = Selected Excavation = Selected Sifting = Selected Backfill = Selected Site Management = Selected Stakeholder Involvement = Selected Case 1: If estimate includes MEC Removal Action , the Site Visit and Stakeholder Involvement Tasks are not available for selection.
Sifting Area	Area.LandAcres + Area.InlandAcres (up to a maximum of 50 acres) + Area.TidalAcres(up to a maximum of 50 acres) meeting criteria above, up to a maximum of 10 acres
Vegetation	<Area.Vegetation>. Case 1: If Vegetation is null, use Low Grass and Few

Parameter	Data Entry Rules and Assumptions
	Shrubs as the Vegetation type. Case 2: If Vegetation is water, use Barren or Low Grass as the Vegetation type.
Soil Type	<Area.soiltype>. See Table 57. Case 1: If soil is null, use Sand/Gravelly Sand Mixture
Include Per Diem	Selected
Safety Level	E

Table 57 – Soil Types

FUDSMIS ID	FUDSMIS Soil Type	Soil Type for MEC Sifting and Excavation
1	Sand/Gravel Sand	Sand/Gravelly Sand Mixture
2	Sand-Silt/Sand-Clay	Sand-Silt/Sand-Clay Mixture
3	Silt/Silty Clay	Silt/Silty Clay Mixture
4	Clay-Sand/Clay-Silt	Silt/Silty Clay Mixture
5	Gravel/Gravel Sand	Gravel/Gravel Sand Mixture
6	Clay/Sand with Stone	Sand/Gravelly Sand Mixture
7	Rock	Gravel/Gravel Sand Mixture

5.4.3.2 Site Preparation Tab

Table 58 – Data Entry Rules for the Site Preparation Tab in the MEC Sifting Technology

Parameter	Data Entry Rules and Assumptions
Vegetation Removal	
Heavy Removal	Calculated by the RACER technology based on Sifting Area input and Vegetation Type selected on the System Definition Tab.
Moderate Removal	Calculated by the RACER technology based on Sifting Area input and Vegetation Type selected on the System Definition Tab.
Light Removal	Calculated by the RACER technology based on Sifting Area input and Vegetation Type selected on the System Definition Tab.

Parameter	Data Entry Rules and Assumptions
No Removal	Calculated by the RACER technology based on Sifting Area input and Vegetation Type selected on the System Definition Tab.
Surface Clearance	
Area	Calculated by the RACER technology based on Sifting Area input on the System Definition Tab.

5.4.3.3 Excavation Tab

**Table 59 – Data Entry Rules for the Excavation Tab
in the MEC Sifting Technology**

Parameter	Data Entry Rules and Assumptions
Area	Calculated by the RACER technology based on Sifting Area input on the System Definition Tab
Depth	1 foot
Total Quantity to Excavate	Calculated by the RACER technology based on Sifting Area input on the System Definition Tab and Depth entered on Excavation Tab
Vehicle Modification	Selected

5.4.3.4 Sifting Tab

**Table 60 – Data Entry Rules for the Sifting Tab
in the MEC Sifting Technology**

Parameter	Data Entry Rules and Assumptions
Front End Loader	Calculated by the RACER technology based on Sifting Area input on the System Definition Tab and Depth entered on Excavation Tab
Vehicle Modification Required	Selected
Dump Truck	Calculated by the RACER technology based on Sifting Area input on the System Definition Tab and Depth entered on Excavation Tab
Vehicle Modification Required	Selected
Soil to be Sifted	Calculated by the RACER technology based on Sifting Area input on the System Definition Tab and Depth entered on Excavation Tab
Soil to be Hand Sorted	Calculated by the RACER technology based on Sifting Area input on the System Definition

-FINAL

Parameter	Data Entry Rules and Assumptions
	Tab and Depth entered on Excavation Tab

5.4.3.5 Backfill Tab

**Table 61 – Data Entry Rules for the Backfill Tab
in the MEC Sifting Technology**

Parameter	Data Entry Rules and Assumptions
Sifted Material to be Used as Backfill	90%
Source of Additional Backfill:	Off-site
Regrading	Calculated by the RACER technology based on Sifting Area input on the System Definition Tab
Reseeding	Calculated by the RACER technology based on Sifting Area input on the System Definition Tab
General Cleanup	Calculated by the RACER technology based on Sifting Area input on the System Definition Tab

5.4.3.6 Site Management Tab

**Table 62 – Data Entry Rules for the Site Management Tab
in the MEC Sifting Technology**

Parameter	Data Entry Rules and Assumptions
Senior UXO Supervisor	Calculated by the RACER technology based on Selections entered on the System Definition Tab
Project Manager	Calculated by the RACER technology based on Selections entered on the System Definition Tab
UXO Supervisor	Calculated by the RACER technology based on Selections entered on the System Definition Tab
Quality Control Supervisor	Calculated by the RACER technology based on Selections entered on the System Definition Tab
Safety Supervisor	Calculated by the RACER technology based on Selections entered on the System Definition Tab

5.4.3.7 Comments Tab

The following text will be entered onto the Comments tab in the MEC Sifting technology:

This technology addresses costs for Munitions and Explosives of Concern (MEC) sifting as part of the Remedial Action – Construction (RA-C) phase for MEC. The sifting technology is used when the historical use of a range includes Open Burn/Open Detonation (OB/OD) and the RAC score is 1-4 because one attributes of an OB/OD range is the large quantity of scrap and other anomalies in the first foot or so of the area.

Input parameters and assumptions used in estimating costs for this technology are as follows:

The acreage for the sifting technology will be equal to the Military Munitions Response (MMR) area up to a maximum of 10 acres. The technology is limited to 10 acres due to other environmental concerns that would likely have to be addressed if the area to be sifted exceeded 10 acres. The vegetation type and soil type are determined from the project MMR Area Data from FUDSMIS <INSERT DATE>. Please reference the document, “Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects” for more specific information of how the MMR data is transformed for inputs for this technology.

5.5 RA-C for MC Phase

The RA-C for MC phase will be included for all MMRP projects requiring CTC estimates that meet all of the following conditions.

- Former use or Range Type includes one or more of the following:
 - Hand grenades
 - OB/OD *
 - Small arms
 - Recreational skeet
 - Explosive-contaminated soil.

*If the only former use selected in any of the MMR areas is OB/OD and the RAC score for all the MMR areas is 5, this phase will not be created. The RA-C for MEC phase was not run, of the Sifting model did not generate soil volume to be accounted for in the Offsite Transportation and Waste Disposal model. No other models would be needed in this phase in this situation.

The RA-C for MC phase will be set up using the Remedial Action phase type in *RACER*. The data entry rules and assumptions for an RA-C for MEC phase are presented in Table 63.

Table 63 – Data Entry Rules for the RA-C Phase for MC

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
Name	RA-C for MC
Description	The Remedial Action-Construction (RA-C) phase is

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
	included when Munitions Constituents (MC) are suspected to be present at projects with Military Munitions Response (MMR) areas that have a historical uses of Hand Grenade Range, Open Burn/Open Detonation (OB/OD), Small Arms Range, Recreational Skeet Range, or Explosives Contaminated Soil. Areas that have hand grenade range, small arms, recreation skeet or explosive contaminated soil will be excavated. Areas that are RAC 1-4 with OB/OD are handled with the sifting model in the RA-C for MEC phase, but the soil assumed to be contaminated from the sifting operation is disposed of in this phase.
Media/Waste Type	Soil
Secondary Media/Waste Type	None
Contaminant	Ordnance (not residual)
Secondary Contaminant	None
Approach	Ex Situ
Phase Start Date	<Project.StartYear> plus 3 years
Labor Rate Group	System Defaults
Analysis Rate Group	System Defaults
Technology Markups	System Defaults
Phase Start Date	PhaseDate = Project.StartYear + 3 years
Markup Template	V7 – FUDS RD, RmD, RA-C, RmA-C, IRA, RA-O
Technology Markups	System Defaults

5.5.1 Excavation (Small Arms and Recreational Skeet)

The RA-C for MC phase costs will be estimated using several technologies in *RACER*. The Excavation technology will be included in the RA-C for MC phase only if all of the conditions specified below are met:

- Historical use = Small Arms or Recreational Skeet.

The data input rules and assumptions for the Excavation technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.5.1.1 System Definition Tab

**Table 64 – Data Entry Rules for the System Definition Tab
in the Excavation Technology
for Small Arms and Recreational Skeet**

Parameter	Data Entry Rules and Assumptions
Length	Square root of Number of MMR Acres up to 10 * 43560. MMR Acres is the sum of Area.LandAcres, Area, InlandAcres(up to 50 acres) and Area.TidalAcres(up to 50 acres). If the sum is zero, use 10 acres.,
Width	Square root of Number of MMR Acres up to 10 * 43560.
Depth	1
Rock Requiring Blasting	Not Selected
Rock Requiring Ripping	Not Selected
Soil Type	See Table 57.
Safety Level	E
Sidewall Protection	None
Excavation Dewatering Required	Not Selected
Drum Removal Required	Not Selected
Perform Ground Penetrating Radar	Not Selected
Number of Confirmatory Soil Samples	100
Soil Analytical Template	FUDS – MC Soil Template

5.5.1.2 Comments Tab

The following text will be entered onto the Comments tab in the Excavation technology:

This technology addresses costs for excavating soil contaminated with Munitions Constituents (MC) due to the historical use of small arms and recreational skeet. Input parameters and assumptions used in estimating costs for this technology are as follows:

For each Military Munitions Response (MMR) area that has Small Arms or Recreational Skeet selected as a historic use, the MMR area acreage, up to 10 acres, will be excavated. The area to be excavated was determined based on conversations with range experts in St. Louis and Rock Island. Refer to the document, "Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects" for more specific information of how the MMR data is transformed for inputs for this technology.

This excavation model area is for the MMR Area <INSERT Area.AREAID with Small Arms and Recreational Skeet> that has the historical use of small arms and/or recreational skeet. The excavated area is the total MMR area up to 10 acres. The MMR area is determined by the Land Acres plus up to 50 inland water acres, plus up to 50 tidal water acres not to exceed 10 acres.

Ten percent of the excavated soil is assumed to be contaminated with MC based on engineering judgment and experience and will be transported off site with additional backfill being used to fill the excavated area. One hundred confirmatory soil samples will be taken for each excavation performed.

5.5.2 Excavation (Hand Grenades and Explosive Contaminated Soil)

The RA-C for MC phase costs will be estimated using several technologies in *RACER*. The Excavation technology will be included in the RA-C for MC phase only if all of the conditions specified below are met:

- Historical use = Hand Grenades and/or Explosive Contaminated Soil.

The data input rules and assumptions for the Excavation technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.5.2.1 System Definition Tab

**Table 65 – Data Entry Rules for the System Definition Tab
in the Excavation Technology for Hand Grenades
and Explosive Contaminated Soil**

Parameter	Data Entry Rules and Assumptions
Length	Square root of (1 for Hand Grenades) Selection + 1 for Explosives Contaminated Soil) *43560.
Width	Square root of (1 for Hand Grenades) Selection + 1 for Explosives Contaminated

Parameter	Data Entry Rules and Assumptions
	Soil) *43560.
Depth	1
Rock Requiring Blasting	Not Selected
Rock Requiring Ripping	Not Selected
Soil Type	See Table 57.
Safety Level	E
Sidewall Protection	None
Excavation Dewatering Required	Not Selected
Drum Removal Required	Not Selected
Perform Ground Penetrating Radar	Not Selected
Number of Confirmatory Soil Samples	100
Soil Analytical Template	FUDS – System Soil – Ordnance Residual (modified) Template

5.5.2.2 Comments Tab

The following text will be entered onto the Comments tab in the Excavation technology:

Case 1:

If Hand Grenades is selected as historical use:

The following Military Munitions Response (MMR) area(s) <INSERT Area.AreaID that has Hand Grenades selected>has Hand Grenades selected as a historical use. The assumed excavated area of MC concern is 1 acre for each MMR area identified. The 1-acre assumption is based on information provided by the U.S Army Corps of Engineers Rock Island District concerning the typical size of hand grenades ranges.

Case 2:

If Explosives Contaminated Soil is selected as historical use:

The following MMR area, <INSERT Area.AreaID that have ECS selected>, have explosive contaminated soil selected as a historical use. The assumed excavated area of MC Concern is 1 acre for each area identified. The exact area of MC concern is uncertain since these types of areas are typically found at production facilities. Therefore, 1 acre will be excavated for each Military Munitions Response area that has explosive contaminated soil selected as a historical use to develop a reasonable estimate for the clean up.

The following is always included in the comment field.

Ten percent of the excavated soil is assumed to be contaminated with MC based on engineering judgment and experience and will be transported off site with additional backfill being used to fill the excavated area. One hundred confirmatory soil samples will

be taken for each excavation performed. Refer to the document, "Rules and Assumptions for Developing and Reporting FY 2005 Cost to Complete Estimates for FUDS MMRP Projects" for more specific information of how the MMR data is transformed for inputs for this technology.

5.5.3 Off-site Transportation and Waste Disposal

The RA-C for MC phase costs will be estimated using several technologies in *RACER*. The Off-Site Transportation and Waste Disposal technology will be included in the RA-C for MC phase only if one or more of the conditions specified below are met:

- RA-C for MEC phase includes MEC sifting technology.
- RA-C for MC phase includes one or more Excavation technologies.

The Off-Site Transportation and Waste Disposal technology has an upper valid range of 350,000 cubic yards (CY). If the total volume from the Excavation and MEC Sifting technologies exceeds 350,000 CY, this technology will be included more than once.

The data input rules and assumptions for the Off-Site Transportation and Waste Disposal technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.5.3.1 System Definition Tab

**Table 66 – Data Entry Rules for the System Definition Tab
in the Off-Site Transportation and Waste Disposal Technology**

Parameter	Data Entry Rules and Assumptions
Waste Type	Hazardous
Waste Form	Solid
Condition of Waste	Bulk to remain as bulk.
Volume of Bulk Solid	(10% of excavation volume plus 10% of the volume from MEC Sifting) * 1.25 bulking factor.
Volume of Bulk Liquid	N/A
Number of Non-Leaking Drums	N/A
Number of Leaking Drums	N/A
Distance to Off-site Facility	250
Safety Level	E

5.5.3.2 Waste Disposal Tab

**Table 67 – Data Entry Rules for the Waste Disposal Tab
in the Off-Site Transportation and Waste Disposal Technology**

Parameter	Data Entry Rules and Assumptions
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Parameter	Data Entry Rules and Assumptions
Stabilization Required	Selected
Stabilization Not Required	Not Selected

5.5.3.3 Disposal Fees Tab

**Table 68 – Data Entry Rules for the Disposal Fees Tab
in the Off-Site Transportation and Waste Disposal Technology**

Parameter	Data Entry Rules and Assumptions
Disposal Fee Type	Average Disposal Fee
Disposal Fee Amount	Based on Average Disposal Fee Cost from System Calculation .
State Tax/Fee (for Hazardous Waste)	\$0

5.5.3.4 Comments Tab

The following text will be entered onto the Comments tab in the Off-site Transportation and Waste Disposal technology:

This technology addresses costs associated with transporting and disposing of soil containing Munitions Constituents (MC). Input parameters and assumptions used in estimating costs for this technology are as follows:

The volume used in the Off-Site Transportation and Waste Disposal model is 10% of the volume calculated in the Excavation model(s) plus 10% of the volume calculated in the MEC Sifting model from the RA-C phase for MEC, if estimated. A bulking factor of 25% was used to account for the expansion of the excavated soil. The soil is considered contaminated with MC and is therefore considered hazardous. Since only soil is being transported, it is considered as solid.

5.5.4 Cleanup and Landscaping

The RA-C for MC phase costs will be estimated using several technologies in *RACER*. The Cleanup and Landscaping technology will be included in the RA-C for MC phase only if one or more of the conditions specified below are met:

- Total excavated area is greater than zero

The Cleanup and Landscaping technology has an upper valid range of 999 acres. If the total area from the Excavation technologies exceeds 999 acres, this technology will be included more than once.

The data input rules and assumptions for the Cleanup and Landscaping technology are described in the subsections that follow. Details including definitions and valid ranges

for the data input parameters for this technology are provided in the *RACER* help system.

5.5.4.1 System Definition Tab

**Table 69 – Data Entry Rules for the System Definition Tab
in the Cleanup and Landscaping Technology**

Parameter	Data Entry Rules and Assumptions
Type of Site Preparation	Landscape
Preparation Area	Case 1: For each Military Munitions Response area that includes Small Arms or Recreational Skeet as a former use, up to a maximum of 10 acres will be included in the preparation area. Case 2: For each Military Munitions Response area that includes Hand Grenades as a former use, 1 acre will be included in the preparation area. Case 3: For each Military Munitions Response area that includes Explosives Contaminated Soil as a former use, 1 acre will be included in the preparation area.
Safety Level	E

5.5.4.2 Landscaping Tab

**Table 70 – Data Entry Rules for the Landscaping Tab
in the Cleanup and Landscaping Technology**

Parameter	Data Entry Rules and Assumptions
Type	Seeding
Area	100%

5.5.4.3 Comments Tab

The following text will be entered onto the Comments tab in the Clean up and Landscaping technology:

This technology addresses costs associated with clean up and landscaping the areas where excavations for the removal of Munitions Constituents (MC) occurred: The area is determined from the excavations that are required for this project.

5.5.5 Professional Labor Management

The RA-C for MC phase costs will be estimated using several technologies in *RACER*. The Professional Labor Management (PLM) technology will be included in the RA-C for MC phase if the Excavation, Offsite Transportation and Waste Disposal and/or Cleanup and Landscaping models were run.

The data input rules and assumptions for the PLM technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.5.5.1 System Definition Tab

**Table 71 – Data Entry Rules for the System Definition Tab
in the Professional Labor Management Technology**

Parameter	Data Entry Rules and Assumptions
Percentage Method	Selected
RA Complexity	Low
Task Percent Template	N/A
User Defined Labor Hour Estimate	Not Selected
Labor Hours Template	N/A

5.5.5.2 Comments Tab

The following text will be entered onto the Comments tab in the Professional Labor Management technology:

This technology addresses costs associated with the Professional Labor Management (PLM) during the Munitions Constituent (MC) remediation portion of the Remedial Action-Construction (RA-C) phase.

The RA complexity was assumed to be low based on the fact that Munitions and Explosives of Concern (MEC) activities will, in most cases, be active on the project during the MC remediation. Therefore, costs for Project Management, Planning Document, Construction Oversight, Drawings, etc are primarily covered under the MEC activities. A low amount of professional oversight is expected for the MC activities.

The amount for Permitting allowance was changed to zero since permits are unlikely to be required for the RA-C for MC phase.

5.6 Long Term Management (LTM) Phase

The LTM phase will be included for all MMRP projects requiring CTC estimates that meet one or more of the following conditions.

- The project includes the RA-C for MEC phase.
- The project includes the RA-C for MC phase.

The LTM phase will be set up using the Long-Term Monitoring phase type in *RACER*. The data entry rules and assumptions for an LTM phase are presented in Table 72.

Table 72 – Data Entry Rules for the LTM Phase

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
Phase Name	LTM
Description	The Long Term Management (LTM) phase addresses costs for periodic communications with all stakeholders and to insure the 5-year review process required under the Comprehensive Environmental Response, Compensation and Liability Act is met.
Media Waste/Type	N/A
Secondary Media/Waste Type	N/A
Contaminant	None
Secondary Contaminant	None
Phase Start Date	<Project.StartYear> plus 3 years
Labor Rate Group	System Defaults
Analysis Rate Group	System Defaults
Markup Template	V7 – FUDS LTM Phase Template
Technology Markups	System Defaults

5.6.1 MEC Monitoring

The LTM phase costs will be estimated using the MEC Monitoring technology in *RACER*. Three instances of the MEC Monitoring technology will always be included in the LTM phase.

The data input rules and assumptions for the MEC Monitoring technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.6.1.1 System Definition Tab

Table 73 – Data Entry Rules for the System Definition Tab in the MEC Monitoring Technology

Parameter	Data Entry Rules and Assumptions
NOTE:	Run technology 3 times: 2 events (1 every 5 years for 10 years) 30 - year total duration.
Tasks to Include	Visit/Planning = Selected
	Documentation = Selected
Site Distance (One-Way)	250
Site Complexity	Moderate
Year of Monitoring Start	The first instance uses the phase start date.
	The second instance uses the phase start date + 10.
	The third instance uses the phase start date + 20.
Monitoring Frequency	2 Events (Once per 5 years, 10 year duration) = Selected
	3 Events (Once per 4 years, 12 year duration) = Not Selected
	4 Events (Once per 3 years, 12 year duration) = Not Selected

5.6.1.2 Visit/Planning Tab

**Table 74 – Data Entry Rules for the Visit/Planning Tab
in the MEC Monitoring Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Site Visit = Selected
	Photo Elevation Log = Selected
	Pre-Draft Document = Selected
	Meeting with Stakeholders = Selected

5.6.1.3 Documentation Tab

**Table 75 – Data Entry Rules for the Documentation Tab
in the MEC Monitoring Technology**

Parameter	Data Entry Rules and Assumptions
Tasks to Include	Draft Final Report = Selected
	Report Presentation = Selected
	Final Report = Selected

Parameter	Data Entry Rules and Assumptions
	Responsibilities Matrix = Selected
	Educational Materials = Selected

5.6.1.4 Comments Tab

The following text will be entered onto the Comments tab in the MEC Monitoring technology:

Long Term Management is a required phase under the Remedial Process described in the Engineering Regulation 200-3-1 for projects that have progressed from a Preliminary Assessment (PA) phase into the Remedial Action – Construction (RA-C) phase. It is assumed that one visit every five years will be required until the project can reach project closeout. For estimating purposes, the five-year reviews that are included in the Munitions and Explosives Constituents (MEC) Monitoring Technology will occur every five years for 30 years. This will insure that the five year review process required by the Comprehensive Environmental Response, Compensation, and Liability Act are met.

5.7 Project Closeout (PCO) Phase

The PCO phase will be included for all FUDS MMRP projects requiring CTC estimates. The PCO phase will be set up using the Site Closeout phase type in *RACER*. The data entry rules and assumptions for an LTM phase are presented in Table 76.

Table 76 – Data Entry Rules for the PCO Phase

Data Entry Field on Level 3 Screen	Data to be Entered and Associated Rules
Phase Name	PCO
Description	The costs in this phase are estimated to be coordination costs with regulators once the U.S Army Corp of Engineers have determined that no further actions are necessary for the Department of Defense to undertake.
Media Waste/Type	N/A
Secondary Media/Waste Type	N/A
Contaminant	None
Secondary Contaminant	None
Phase Start Date	<Project.StartYear> plus 33 years, or one year after last phase run, whichever occurs first
Labor Rate Group	System Defaults
Analysis Rate Group	System Defaults
Markup Template	V7 – FUDS PCO Phase Template
Technology Markups	System Defaults

5.7.1 Site Closeout Documentation

The PCO phase costs will be estimated using the Site Closeout Documentation technology in *RACER*. The Site Closeout Documentation technology will always be included in the PCO phase. The data input rules and assumptions for the Site Closeout Documentation technology are described in the subsections that follow. Details including definitions and valid ranges for the data input parameters for this technology are provided in the *RACER* help system.

5.7.1.1 System Definition Tab

Table 77 – Data Entry Rules for the System Definition Tab in the Site Closeout Documentation Technology

Parameter	Data Entry Rules and Assumptions
Meetings	Selected

Parameter	Data Entry Rules and Assumptions
Work Plans and Reports	Not Selected
Documents	Not Selected
Abandon Wells	Not Selected
Site Close-out Complexity	Low

5.7.1.2 Meetings Tab

**Table 78 – Data Entry Rules for the Meetings Tab
in the Site Closeout Documentation Technology**

Parameter	Data Entry Rules and Assumptions
Kick Off/Scoping Meetings	Selected
	Number of Meetings = 1
	Travel = Selected
	Number of Travelers = 1
	Number of Days = 1
	Airfare = \$750
Review Meetings	Selected
	Number of Meetings = 1
	Travel = Selected
	Number of Travelers = 1
	Number of Days = 1
	Airfare = \$750
Regulatory Review Meetings	Selected
	Number of Meetings = 1
	Travel = Selected
	Number of Travelers = 1
	Number of Days = 1
	Airfare = \$750

5.7.1.3 Documents Tab

**Table 79 – Data Entry Rules for the Documents Tab
in the Site Closeout Documentation Technology**

Parameter	Data Entry Rules and Assumptions
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Parameter	Data Entry Rules and Assumptions
Tasks to Include	Draft Decision Document = Not Selected
	Draft Final Decision Document = Not Selected
	Final Decision Document =Not Selected
	Long Term Document Storage = Not Selected
Number of Boxes	N/A
Duration of Storage (YRS)	N/A

5.7.1.4 Comments Tab

The following text will be entered onto the Comments tab in the Site Closeout Documentation technology:

The costs in this phase are estimated to be costs associated with the coordination, meeting, and travel between State Regulators, Federal Regulators and Stakeholders, once the U.S. Army Corp of Engineers has determined that no further actions are necessary for the Department of Defense to undertake.

6. Input Data Dictionary

Table 80 - Property Table

Data Element Name	FUDSMIS Field Name	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
PropNumber	FUDS_NUMBER	FUDSMIS-generated Property ID Number	Level 1 (FUDS Property) ID
PropName	(Installation) NAME	FUDSMIS Property Name (former name of installation/facility when operational)	Level 1 (FUDS Property) Name
District	SUBCOM_CODE	3-Letter USACE FUDS District Code	Folder Name (appended to District Code)
District Name			
Division	MACOM_CODE	3-Letter USACE FUDS Division Code	Folder Name
Division Name			
State	STATE	State	Level 1 (FUDS Property) State
City	CITY	City	Level 1 (FUDS Property) City
TotalPropertyArea	PROPERTY_ACREAGE	Total acreage for the property per FUDSMIS Installation table	Used as text note in the Level 1 (FUDS Property) Description Field; also used to determine how many instances of the OER and OEC technologies need to be run and how many acres to be entered in those technologies.
PropertyDescription		Property Description	Used as a text note in the Level 1 (FUDS Property) Description field.
PropertyHistory		Property History	Used as a text note in the Level 1 (FUDS Property) Description field.
Location Code			

Table 81 - Project Table

Data Element Title	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
PropNumber	FUDSMIS Property Number	Foreign key to the Property table
ProjectNumber	FUDSMIS Project Number	Level 2 (Project) ID
ProjectName	FUDSMIS Project Name	Level 2 (Project) Name
StartYear	Start Year	Level 2 (Project) Initial Phase Start Date
POC (ProjectPM)		
Phone (ProjectPM)		
Email (ProjectPM)		
MMRProjDesc	Military Munitions Response Project Description	Used in text note in the Level 2 (Project) Description field
MMRSurveyPOC	Name of Military Munitions Response Survey Point of Contact	Used in text note in the Level 2 (Project) Description field
MMSurvey_Phone	Telephone Number for Military Munitions Response Survey Point of Contact	Used in text note in the Level 2 (Project) Description field
MMR Survey_Email	e-mail address for Military Munitions Response Survey Point of Contact	Used in text note in the Level 2 (Project) Description field
ProjectCategory	Project Category	Level 2 (Project) Type; always set at OEW
Sitekey		
TotalCost		
Exclude		

Table 82 - Area Table

Data Element Title	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
PropNumber	FUDSMIS Property Number	Foreign key to the Property table
ProjID	FUDSMIS Project Number	Foreign key to the Project table
AreaID	Area Identification Number	Not used in the Wrapper
AreaName	Area Name	Not used in the Wrapper
LandAcres	Military Munitions Response Land Acres for the Area	Used in calculating Area.TotalAcres
TidalAcres	Military Munitions Response Tidal Water Acres for the Area	Used in calculating Area.TotalAcres
InlandAcres	Military Munitions Response Inland Acres for the Area	Used in calculating Area.TotalAcres
PublicExposurePathway		
MMRDescription	Military Munitions Response Description	Not used in the FY04 FUDS Wrapper
RACScoreforArea	RAC Score for the Area	Used in the Remedial Action-Construction (RA-C) phase to determine whether the MEC Removal Action technology should be run.
Topography	Topography	Determines the topography field in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Vegetation	Vegetation	Determines the Vegetation field in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
SoilType	Soil Type	Determines the Soil Type field in the MEC Sifting cost technology.
Air2Air	Former Use, Air-to-Air	Determines whether the Air-to-Air range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Air2Ground	Former Use, Air-to-Ground	Determines whether the Air to Ground range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.

Data Element Title	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
Artillery	Former Use, Artillery Range	Determines whether the Artillery range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Bombing	Former Use, Bombing Range	Determines whether the Bombing range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Buffer Area	Former Use, Buffer Area	Determines whether the Other range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Burial Pit	Former Use, Burial Pit	Determines whether the Burial Pit range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Explosive Contaminated Soil	Former Use, Explosive Contaminated Soil	Determines whether the Other range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Guided Missiles	Former Use, Guided Missiles	Determines whether the Guided Missile range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Hand Grenade	Former Use, Hand Grenades	Determines whether the Hand Grenade range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Mortar	Former Use, Mortars	Determines whether the Mortar range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Multiple/Combined Use	Former Use, Multiple/Combination	Determines whether the Multiple/Combination range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
OBOD	Former Use, Open Burn/Open Detonation	Determines whether the OB/OD range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Other	Former Use, Other	Determines whether the Other range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.

Data Element Title	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
R&D	Former Use, R&D	Determines whether the Other range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
RCRA Disposal	Former Use, RCRA Disposal Unit	Determines whether the Other range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Recreational Skeet	Former Use, Recreational Skeet	Determines whether the Small Arms range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Rifle Grenade, Anti-Tank Rocket	Former Use, Rifle/Grenade	Determines whether the Rifle, Grenade, Anti Tank range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Small Arms	Former Use, Small Arms Range	Determines whether the Small Arms range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Training Area/Maneuver Area	Former Use, Training or Maneuver Area	Determines whether the Other range type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Small Arms (expended)	Type of Ordnance, Small Arms (Expended)	Determines whether the Small Arms munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Small Arms (complete rounds)	Type of Ordnance, Small Arms (Complete)	Determines whether the Small Arms munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Hand Grenades, Live	Type of Ordnance, Hand Grenades, Live	Determines whether the Hand Grenade, Live munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Hand Grenades (Incendiary, Smoke)	Type of Ordnance, Hand Grenades	Determines whether the Hand Grenade, Live munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Hand Grenades (WP)	Type of Ordnance, Hand Grenades	Determines whether the Hand Grenade, Live munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.

Data Element Title	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
Hand Grenades (Practice)	Type of Ordnance, Hand Grenades, Practice	Determines whether the Hand Grenade, Practice munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Bombs, High Explosive	Type of Ordnance, Bombs, High Explosive	Determines whether the Bomb, High Explosive munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Bombs (Incendiary, Photoflash)	Type of Ordnance, Bombs, Incendiary, Photoflash	Determines whether the Bomb, WP Incendiary, Photoflash munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Bombs (WP)	Type of Ordnance,	Determines whether the Bomb, WP Incendiary, Photoflash munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Bombs, Practice	Type of Ordnance, Bombs, Practice	Determines whether the Bombs, Practice munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Ground Rockets, Live	Type of Ordnance, Rocket Grenade, Live	Determines whether the Ground Rockets, Rifle Grenades, Live munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Rifle Grenades, Live	Type of Ordnance, Rifle Grenade, Live	Determines whether the Ground Rockets, Rifle Grenades, Live munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Ground Rockets, Rifle Grenades (Incendiary, Smoke)	Type of Ordnance, Rocket Grenade	Determines whether the Ground Rockets, Rifle Grenades, Live munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Ground Rockets, Rifle Grenades(WP)	Type of Ordnance, Rocket Grenade	Determines whether the Ground Rockets, Rifle Grenades, Live munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.

Data Element Title	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
Ground Rockets, Rifle Grenades, Practice	Type of Ordnance, Rocket Grenade, Practice	Determines whether the Ground Rockets, Rifle Grenades, Practice munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Medium caliber (20, 25, 30mm), HE	Type of Ordnance, Medium Caliber, High Explosive	Determines whether the Medium Caliber (20mm, 25mm, and 30mm) munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Medium caliber (20, 25, 30 mm), Practice	Type of Ordnance, Medium Caliber, Practice	Determines whether the Medium Caliber (20mm, 25mm, and 30mm) munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Large caliber (37mm and larger), HE	Type of Ordnance, Large Caliber, High Explosive	Determines whether the Large Caliber (37mm and larger) munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Large caliber (37mm and larger), (Incendiary, Smoke)	Type of Ordnance, Large Caliber	Determines whether the Large Caliber (37mm and larger) munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Large caliber (37mm and larger) (WP)	Type of Ordnance, Large Caliber	Determines whether the Large Caliber (37mm and larger) munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Large caliber (37mm and larger), Practice	Type of Ordnance, Large Caliber, Practice	Determines whether the Large Caliber (37mm and larger) munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Mortars, HE	Type of Ordnance, High Explosive Mortars	Determines whether the Mortars munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Mortars, (Incendiary, Illumination, Smoke)	Type of Ordnance, Mortars	Determines whether the Mortars munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Mortars (WP)	Type of Ordnance, Mortars	Determines whether the Mortars munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.

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Data Element Title	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
Mortars, Practice	Type of Ordnance, Practice Mortars	Determines whether the Mortars munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Aerial Rockets (Live)	Type of Ordnance, Aerial Rockets, Live	Determines whether the Aerial Rockets (Live) munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Aerial Rockets (WP)	Type of Ordnance, Aerial Rockets	Determines whether the Aerial Rockets (Live) munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Aerial Rockets (Practice)	Type of Ordnance, Aerial Rockets, Practice	Determines whether the Aerial Rockets (Practice) munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Guided Missiles, Ground	Type of Ordnance, Guided Missile, Ground	Determines whether the Guided Missile munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Guided Missiles, Aerial	Type of Ordnance, Guided Missile, Aerial	Determines whether the Guided Missile munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Landmines, Anti-Personnel	Type of Ordnance, Land Mines, Anti-personnel	Determines whether the Land Mines munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Landmines, Anti-Tank	Type of Ordnance, Land Mines, Anti-Tank	Determines whether the Land Mines munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Landmines, Practice (with spotting charges)	Type of Ordnance, Land Mines, Practice	Determines whether the Land Mines munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Pyrotechnics	Type of Ordnance, Pyrotechnics	Determines whether the Pyrotechnics munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Flares, signals, simulators or screening smoke (other than white phosphorus)	Type of Ordnance, Flares	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.

Data Element Title	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
Riot Control Agents	Type of Ordnance, Riot Control Agent	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Demolition Materials	Type of Ordnance, Demolition Materials	Determines whether the Demolition Materials munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Detonators	Type of Ordnance, Detonator	Determines whether the Demolition Materials munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Blasting Caps	Type of Ordnance, Blasting Cap	Determines whether the Demolition Materials munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Fuses, Boosters, or Bursters	Type of Ordnance, Fuses	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Primary or Initiating Explosives	Type of Ordnance, Primary Initiating Explosive	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Secondary Explosives (PETN, Comp A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	Type of Ordnance, Secondary Explosive	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Military Dynamite	Type of Ordnance	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Less Sensitive Explosives (Ammonium Nitrate, Explosive D, etc.)	Type of Ordnance, Less Sensitive Explosives	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Propellants (Solid, Liquid)	Type of Ordnance, Propellants	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.

Data Element Title	Data Element Definition	Where Data Used in <i>RACER</i> Estimate
Practice Ordnance (without spotting charges)	Type of Ordnance, Practice Ordnance	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Torpedoes/Sea Mines	Type of Ordnance, TorpedMECs	Determines whether the Guided Missiles munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Gas ID Sets	Type of Ordnance, Gas Identification Sets	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Toxic Chemical Munitions	Type of Ordnance, Toxic Chemical Munitions	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Radiological Munitions	Type of Ordnance, Radiological Munitions	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Experimental	Type of Ordnance, Experimental	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Biological Munitions	Type of Ordnance, Biological Munitions	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
Other	Type of Ordnance, Other	Determines whether the Other munitions type is selected in the MEC Site Characterization and Removal Assessment cost technology and the MEC Removal Action cost technology.
DepthToGroundwater		Used to determine depth to groundwater in technologies.

GLOSSARY**Acronyms and Abbreviations.**

Acronym	Meaning
ACSIM	Assistant Chief of Staff for Installation Management
AR	Army Regulation
ARC	Annual Report to Congress
AWP	Annual Workplan
BD/DR	Building Demolition and Debris Removal
BDI	Budget Development Instructions
BES	Budget Estimate Submission
BY	Budget Year
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFO	Chief Financial Officer
CFR	Code of Federal Regulations
CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
CTC	Cost-to-Complete
CX	Center of Expertise
CY	Current Year
DA	Department of the Army
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DoDI	Department of Defense Instruction
DUSD(I&E)	Deputy Under Secretary of Defense for Installation and Environmental
EE/CA	Engineering Evaluation and Cost Analysis
ELR	Environmental Liability Report
EO	Executive Order
ER	Engineer Regulation
ER	Environmental Restoration
ER-FUDS	Environmental Restoration – Formerly Used Defense Sites
FFMIA	Federal Financial Management Improvement Act
FMR	Financial Management Regulation
FPMI	FUDS Program Management Indicators
FUDS	Formerly Used Defense Sites
FUDSMIS	Formerly Used Defense Sites Management Information System
FY	Fiscal Year
FYDP	Future Years Defense Plan
GMRA	Government Management Reform Act
GPRA	Government Performance and Results Act
HQ	Headquarters
HQDA	Headquarters, Department of the Army

Acronym	Meaning
HQUSACE	Headquarters, USACE
HTRW	Hazardous, Toxic, and Radioactive Waste
HTRW CX	HTRW Center of Expertise
INPR	Inventory Project Report
IR	Installation Restoration
IRA	Interim Removal Action
IRP	Installation Restoration Program
LCP	Life-Cycle Plan
M&S	Management and Support
MC	Munitions Constituents
MCACES	Micro Computer Aided Cost Engineering System
MEC	Munitions and Explosives of Concern
MM	Military Munitions
MM CX	Military Munitions Center of Expertise
MMRP	Military Munitions Response Program
NCP	National Oil and Hazardous Substance Pollution Contingency Plan (a.k.a., National Contingency Plan)
NDAI	No DoD Action Indicated
NPL	National Priority List
OADUSD (CL)	Office of the Assistant Deputy Under Secretary of Defense (Environmental Cleanup)
ODUSD(I&E)	Office of the Deputy Under Secretary of Defense (Installations and Environment)
OMB	Office of Management and Budget
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment
PCO	Project Closeout
PDI	Program Development Instruction
PDT	Project Delivery Team
PgDT	Program Delivery Team
PgM	Program Manager
PIRS	Project Information Retrieval System
PL	Public Law
PM	Project Manager
PMP	Project Management Plan
POM	Program Objective Memorandum
PPBES	Planning, Programming, Budgeting, Execution System
PRESBUD	President's Budget
PRP	Potentially Responsible Party
QA	Quality Assurance
QC	Quality Control
QMP	Quality Management Plan

Acronym	Meaning
QSM	Quality System Manager
RA-C	Remedial Action Construction
RACER	Remedial Action Cost Engineering and Requirements
RA-O	Remedial Action Operation
RC	Response Complete
RD	Remedial/Removal Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RIP	Remedy-in-Place
SFFAS	Statement of Federal Financial Accounting Standards
UPB	Unit Price Book
USACE	U.S. Army Corps of Engineers
USC	United States Code
VV&A	Verification, Validation, and Accreditation

Terms.

Budget Estimate Submission (BES).

This is each service's 2-year budget proposal based on PDM. The first two budget years of the POM are the service's budget estimate submission, although all other POM years' fiscal data are summarized and included.

Budget Year (BY) Annual Workplan (AWP).

This is CEMP-DE's draft work directive for BY execution. The draft quarterly obligation or execution plan of the PRESBUD (BY program of the Future Years Defense Plans [FYDP]) is the initial draft BY AWP. This BY AWP will be updated each time the POM and BES are updated. Upon HQDA approval in October after Congressional authorization and appropriation of the PB, this becomes the Current Year (CY) annual workplan.

Center of Expertise (CX).

A CX is a USACE organization that has been approved by HQUSACE as having a unique or exceptional technical capability in a specialized subject area that is critical to other USACE commands. These services may be reimbursable or centrally funded.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Congress enacted CERCLA, commonly known as Superfund, on 11 December 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Cost-to-Complete (CTC).

This is an estimate of current and future costs of a project using the appropriate cost-to-complete software, such as *RACER* or *MCACES*.

Cost Recovery.

Cost recovery involves money received from private parties to compensate DoD for its costs in response action activities for which the private party bears some responsibility. Cost recovery amounts involve completed response action activities and are available for redeposit to the ER-FUDS account for use on other FUDS projects.

Current Liability.

These are liabilities incurred that will be covered by available budgetary resources (i.e., current year and six prior years) encompassing not only new budget authority but also other resources available to cover liabilities for specified purposes in a given year which includes unliquidated obligations.

Current Year (CY) Annual Workplan (AWP).

This is CEMP-DE's official work directive based on the CY appropriated budget for Divisions and Districts to execute. It consists of all CY line items in the official FYDP.

Defense Environmental Restoration Program (DERP).

Congressionally authorized in 1986, DERP promotes and coordinates efforts for the evaluation and cleanup of contamination at Department of Defense installations and Formerly Used Defense Sites. (10 USC 2701 et. seq.)

Determination of Eligibility.

This is an activity conducted by USACE exclusively to determine if a property and project are eligible under the FUDS Program. Information gathered during the determination of eligibility, along with recommendations for further action, if appropriate, is reported in the Inventory Project Report (INPR).

DoD Goals for the DERP.

Formerly called the Defense Planning Guidance (DPG), the DoD Goals for DERP contains the Secretary of Defense's long-range goals and fiscal guidance. It is a major link between Planning and Programming.

DoD's Updated BES and the President's Budget (PRESBUD).

BES will be updated based on the Program Budget Decision. The first budget year of the updated BES is the PRESBUD. OMB assembles the one-year PRESBUD to be submitted to Congress.

Engineering Evaluation/Cost Analysis (EE/CA).

An EE/CA is prepared for all non-time-critical removal actions as required by Section 300.415(b)(4)(i) of the NCP. The goals of the EE/CA are to identify the extent of a hazard, to identify the objectives of the removal action, and to analyze the various alternatives that may be used to satisfy these objectives for cost, effectiveness, and implementability. (EP 75-1-3)

Formerly Used Defense Sites (FUDS) Property.

A FUDS is defined as a facility or site (property) that was under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States at the time of actions leading to contamination by hazardous substances. By the Department of Defense Environmental Restoration Program (DERP) policy, the FUDS program is limited to those real properties that were transferred from DoD control prior to 17 October 1986. FUDS properties can be located within the 50 States, District of Columbia, Territories, Commonwealths, and possessions of the United States.

FUDS Accrued Environmental Restoration Liability.

Cost to conduct environmental restoration activities to correct past contamination problems at Formerly Used Defense Sites properties.

FUDS Project.

A FUDS Project is a unique name given to an area of an eligible FUDS property containing one or more releases or threatened releases of a similar response nature, treated as a discrete entity or consolidated grouping for response purposes. This may include buildings, structures, impoundments, landfills, storage containers, or other areas where hazardous substance are or have come to be located, including FUDS eligible unsafe buildings or debris. Projects are categorized by actions described under installation restoration (HTRW and CON/HTRW), military munitions response program, or building demolition/debris removal. An eligible FUDS Property may have more than one project.

FUDSMIS.

The FUDS Management Information System (MIS) is the corporate information system that supports planning, programming, budgeting, annual workplan development, execution, and reporting requirements for the FUDS program.

Future Years Defense Plans (FYDP).

This contains executable project actions to match available dollars provided in the POM for the current year and subsequent six program years. The FYDP is a series of proposed annual funded workplans that contains all eligible projects and all phases of work identified by Divisions and Districts for all eligible FUDS properties. It is also DoD's master plan database. It contains resourcing decisions made through PPBS. DoD uses it for internal analysis and Congress uses it during review of budget requests. FYDP is a continuous process and is constantly updated based on POM Exhibits, BES, and PRESBUD. However, regularly scheduled updates occur three times during each PPBS cycle:

- After the submission of the services' POM.
- After the submission of the services' BES.
- After the President submits his budget to Congress reflecting any final adjustments made to the DoD budget.

Inventory Project Report (INPR).

The report resulting from the determination of FUDS eligibility. The INPR includes data as well as a recommendation for further action and guides investigators through further site studies. The INPR documents whether DoD is responsible for contamination at a FUDS.

Liability.

A probable and measurable outflow of resources arising from past transactions or events. (*DoD Management Guidance for the DERP*)

Life Cycle Cost (LCC).

CTC plus prior year actual expenditure plus prior year unliquidated obligations.

Life-Cycle Plan (LCP).

The LCP contains all historical data (FY84 through prior year) and CTC plan (CY through Time-to-Complete [TTC]). The official LCP contains the POM balanced FYDP.

Military Munitions.

All ammunition products and components produced for or used by the U armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the *Atomic Energy Act* of 1954 (42 USC 2011, et seq.) have been completed. [10 USC 2710(e)(3)(A)]

Munitions and Explosives of Concern (MEC).

This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means:

- Unexploded ordnance (UXO), as defined in 10 USC 2710 (e)(9);
- Discarded Military Munitions (DMM), as defined in 10 USC 2710 (e)(2); or
- Munitions constituents (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC).

Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. [10 USC 2710(e)(4)]

National Oil and Hazardous Substance Pollution Contingency Plan (NCP).

Revised in 1990, the NCP provides the regulatory framework for responses under CERCLA. The NCP designates the Department of Defense as the removal response authority for ordnance and explosives hazards.

No DoD Action Indicated (NDAI).

This is a Formerly Used Defense Sites (FUDS) where USACE has made a programmatic decision that the property or project conforms to the following:

- It is not eligible for consideration under the FUDS program.
- It is categorically excluded from the FUDS program
- The hazards found were not the result of DoD actions on or before 17 October 1986, pose no threat to human health or safety or the environment and, no additional environmental restoration activities are required.

Non-current Liabilities

These include liabilities incurred for which revenues or other sources of funds necessary to pay the liabilities have not been made available through congressional appropriations or current earnings of the reporting entity (i.e., non-current liability equals to the program CTC minus the current-year program funding).

Planning, Programming, Budgeting, and Execution System (PPBES).

Army's system that mirrors the DoD's PPBS.

Potentially Responsible Parties (PRP).

A PRP is defined in CERCLA Section 107 as any person related to a property that is a:

- Current owner or operator.
- Past owner or operator at the time of disposal of any hazardous substance, pollutant, or contaminant.
- Person who arranges for disposal, treatment, or transport for disposal or treatment of hazardous substances.
- Transporter who has selected the site for the disposal of a hazardous substance.

Potentially Responsible Party/Hazardous, Toxic, and Radioactive Waste (PRP/HTRW) Project.

A FUDS where HTRW cleanup requirements exist and parties other than DoD are potentially responsible parties for the hazardous substances, pollutants, or contaminants.

Potentially Responsible Party/Military Munitions Response (PRP/MMRP) Project.

A FUDS where MMRP cleanup requirements exist and parties other than DoD are potentially responsible parties for disposal of the MMRP materials.

Preliminary Assessment (PA).

The Preliminary Assessment is a limited-scope investigation that collects readily available information about a project and its surrounding area. The PA is designed to distinguish, based on limited data, between sites that pose little or no threat to human health and the environment and sites that may pose a threat and require further investigation. The PA also identifies sites requiring assessment for possible emergency response actions. If the PA results in a recommendation for further investigation, a Site Inspection is performed. Refer to the EPA publication *Guidance for Performing Preliminary Assessments Under CERCLA*, September 1991, for additional information.

Program Budget Decision (PBD).

This is a comptroller driven, appropriation-oriented decision upon review and analysis of the services' BES.

Program Decision Memorandum (PDM).

This is DoD's decision document designed to provide each service feedback on how closely its POM meets the DoD Goals for the DERP and to provide each service a baseline for developing BES and PB.

Program Management.

Component of the PMBP undertaken by all USACE echelons to manage programs. It consists of the development, justification, management, defense, and execution of programs within available resources, in accordance with applicable laws, policies, and regulations, and includes accountability and performance measurements. Under program management, programs, projects, and other commitments are aggregated for oversight and direction by the organization's senior leadership. Program management takes project management to a greater level of interdependence and broadens the corporate perspectives and responsibilities.

Program Manager.

Program managers integrate program information and facilitate management. Program managers and Program Management Team members keep higher echelons of the customer's organization updated on all work USACE is performing on their behalf, and assist customers in accessing USACE resources across organizational boundaries. Program managers are responsible for making accurate program projections necessary to support workload analysis at the local, regional, and national level. (ER 5-1-11)

Program Objective Memorandum (POM).

This is the memorandum that documents each service's proposals for resource allocation for six program years to meet fiscal constraints contained in the DoD Goals for the DERP and each service's objectives.

Project Delivery Team (PDT).

The PDT is a multi-disciplined project team lead by the Project Manager with responsibility for assuring that the project stays focused, first and foremost on the public interest, and on the customer's needs and expectations, and that all work is integrated and done in accordance with a PMP and approved business and quality management processes. The PDT focuses on quality project delivery, with heavy reliance on partnering and relationship development to achieve better performance. The PDT shall consist of everyone necessary for successful development and execution of all phases of the project. The PDT will include the customers, the PM, technical experts within or outside the local USACE activity, specialists, consultants/contractors, stakeholders, representatives from other Federal and state agencies, and higher level members from Division and Headquarters who are necessary to effectively develop and deliver the project actions. The customer is an integral part of the PDT. (ER 5-1-11)

Project File.

The body of documents that contains the rationale and justification for the selection of the response action and that supports FUDSMIS data and Cost-to-Complete estimates. It contains all documents in the Administrative Record file as well as additional supporting documentation not included in the Administrative Record file due to issues such as privacy, financial confidentiality, etc.

Project Management.

The application of knowledge, skills, tools, and techniques to project activities to meet or exceed defined expectations.

Project Management Business Process (PMBP).

The fundamental USACE business process used to deliver quality projects. It reflects the USACE corporate commitment to provide “customer service” that is inclusive, seamless, flexible, effective, and efficient. It embodies communication, leadership, systematic and coordinated management, teamwork, partnering, effective balancing of competing demands, and primary accountability for the life cycle of a project.

Project Management Plan (PMP) (PgMP for Programs).

A living document used to define expected outcomes and guide execution and control of project (or program) actions. Primary uses of the PMP are to facilitate communication among participants, assign responsibilities, define assumptions, and document decisions. Establishes baseline plans for scope, cost, schedule, safety, and quality objectives against which performance can be measured, and to adjust these plans as actual performance dictates. The project delivery team develops the PMP.

Project Manager (PM).

The PM is responsible for management and leadership of a project during its entire life cycle, even when more than one USACE District or activity is involved. The PM will generally reside at the geographic District but can be elsewhere as needed. The PM and PDT are responsible and accountable for ensuring the team takes effective, coordinated actions to deliver the completed project according to the PMP. The PM manages all project resources, information and commitments, and leads and facilitates the PDT towards effective development and execution of project actions. (ER 5-1-11)

Quality Assurance (QA).

An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed to meet project requirements defined in the PMP.

Quality Control (QC).

The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established in the PMP; operational techniques and activities that are used to fulfill requirements for quality.

Quality Management.

Processes required to ensure that the actions at the project would satisfy the needs and objectives for which it was undertaken, consisting of quality planning, quality assurance, quality control, and quality improvement.

Quality Management Plan (QMP).

A document that describes a quality system in terms of the organizational structure, policy and procedures, functional responsibilities of management and staff, lines of authority, and required interfaces for those planning, implementing, documenting, and assessing all activities conducted.

Quality System Manager (QSM).

The FUDS Program Manager at a geographic Military Division or District designated as the principal manager within the organization having management oversight and responsibilities for quality management process of the FUDS program at that level.

Remedial or Remedial Action (RA).

Those actions consistent with permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health, welfare or the environment. The term includes, but is not limited to, such actions at the location of the release as storage; confinement; perimeter protection using dikes, trenches, or ditches; clay cover; neutralization; cleanup of released hazardous substances and associated contaminated materials; recycling or reuse; diversion; destruction; segregation of reactive wastes; dredging or excavations; repair or replacement of leaking containers; collection of leachate and runoff; on-site treatment or incineration; provision of alternative water supplies; and any monitoring reasonably required to assure that such actions protect the public health, welfare, and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President determines that, alone or in combination with other measures, such relocation is more cost-effective and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition off-site of hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term includes off-site transport and off-site storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials. (*DoD Management Guidance for the DERP*)

Remedial Action-Construction (RA-C).

The period during which the final remedy is being put in place. The end date signifies that the construction is complete, all testing has been accomplished, and that the remedy will function properly. (*DoD Management Guidance for the DERP*)

Remedial Action-Operations (RA-O).

The period during which the remedy is in place and operating to achieve the cleanup objective identified in the Record of Decision or equivalent agreement. Any system operation or monitoring requirements during this time shall be termed RA-O. (*DoD Management Guidance for the DERP*)

Remedial Design (RD).

A phase of remedial action that follows the remedial investigation/feasibility study and includes development of engineering drawings and specifications for a site cleanup.

Remedial Investigation/Feasibility Study (RI/FS).

An in-depth study designed to gather the data necessary to determine the nature and extent of known contamination at a site, assess risk to human health and the environment, and establish criteria for cleaning up the site. During the FS, the RI data are analyzed and remedial alternatives are identified. The FS serves as the mechanism for the development, screening, and detailed evaluation of alternative remedial actions.

Remedy In Place (RIP).

Designation that a final remedial action has been constructed and implemented and is operating as planned in the remedial design. An example of a remedy in place is a pump-and-treat system that is installed, is operating as designed, and will continue to operate until cleanup levels have been attained. Because operation of the remedy is ongoing, the site cannot be considered Response Complete. (*DoD Management Guidance for the DERP*)

Removal or Removal Action.

The cleanup or removal of released hazardous substances from the environment. Such actions may be taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under section 9604(b), and any emergency assistance which may be provided under the *Disaster Relief and Emergency Assistance Act* [42 USC 5121 et seq.] The requirements for removal actions are addressed in 40 CFR §§300.410 and 300.415. The three types of removals are emergency, time-critical, and non time-critical removals. (*DoD Management Guidance for the DERP*)

Response Action.

A CERCLA-authorized action involving either a short-term removal action or a long-term removal response. This may include, but is not limited to, removing hazardous materials, containing or treating the waste on-site, and identifying and removing the sources of ground water contamination and halting further migration of contaminants.

Response Complete (RC).

The remedy is in place and required remedial action-operations (RA-O) have been completed. If there is no RA-O phase, then the remedial action-construction end date will also be the RC date. (*DoD Management Guidance for the DERP*)

Restoration Advisory Board (RAB).

A Restoration Advisory Board (RAB) is a forum for the discussion and exchange of information between representatives of the Department of Defense (DoD), regulators, state and local governments, tribal governments, and the affected community. RABs provide an opportunity for stakeholders to have a voice and actively participate in the review of technical documents, to review restoration progress, and to provide individual advice to decision makers regarding restoration activities at FUDS Properties and Projects.

Site Inspection (SI).

Activities undertaken to determine whether there is a release or potential release and the nature of associated threats. The purpose is to augment the data collected in the PA and to generate, if necessary, sampling and other field data to determine the presence, type, distribution, density, and location of hazardous substances or military munitions.

Technical Assistance for Public Participation (TAPP).

The TAPP is a DoD program that allows USACE to contract for independent technical assistance to Restoration Advisory Boards and Technical Review Committees based on community member requests for assistance in interpreting scientific and engineering issues related to FUDS property restoration activities.

Time-Critical Removal Action (TCRA).

A TCRA is a response to a release or threat of release that poses such a risk to public health (serious injury or death), or the environment, that clean up or stabilization actions must be initiated within 6 months.